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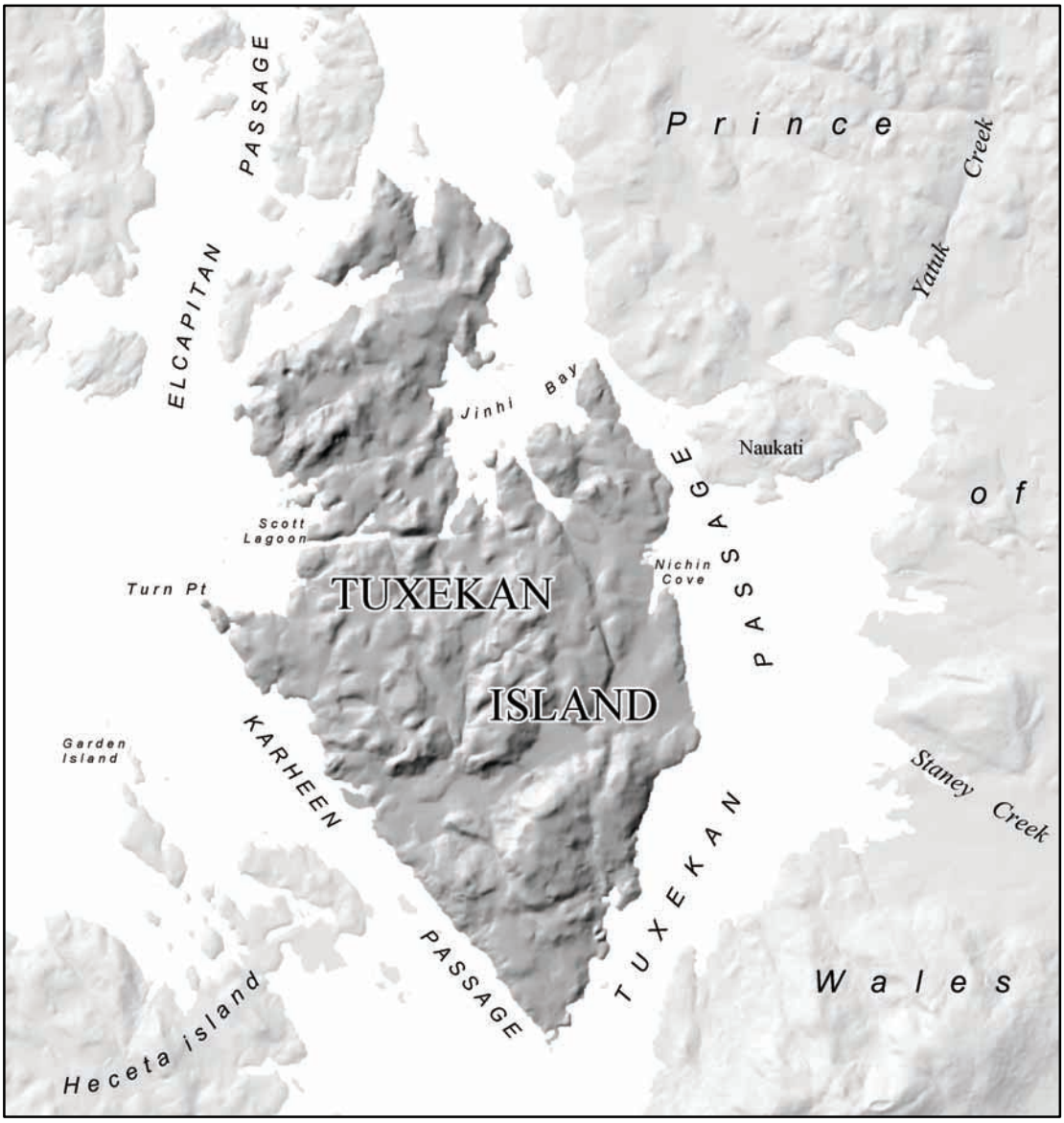
Tuxekan Island Timber Sale Volume C – Appendices to the FEIS



Tuxekan Island Timber Sale FEIS and ROD

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Appendix A- Reasons for Scheduling the Environmental Analysis of the Tuxekan Project Area

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Introduction

This appendix provides an explanation of the rationale for a specific timber harvest project and its importance to the multi-year timber program on the Tongass National Forest. To accomplish this, the following questions are answered:

- Why is timber from the Tongass National Forest being offered for sale?
- How does the Forest Service Develop Forecasts about Future Timber Market Demand?
- What steps must be completed to prepare a sale for offer?
- How does the Forest Service maintain an orderly and predictable timber sale program?
- How does the Forest Service decide where timber sale projects should be located?

Coordinated timber sale planning is essential for meeting the goals of the Tongass Land Management Plan and for providing an orderly flow of timber to local industry. To determine the volume of timber to offer each year, the Forest Service can look to current market conditions and the level of industry operations. However, the planning process for timber harvest projects requires the Forest Service to rely on projections of future harvest levels to decide how many timber sale projects to begin each year. This document explains how the Forest Service uses information about future markets and experience with timber sale planning to determine the volume of timber that needs to be started through this process each year. This appendix relies heavily on the current annual timber demand analysis and the most recent timber sale schedule.

Why is Timber from the Tongass National Forest Being Offered for Sale?

National Legislation

On a national level, the legislative record is clear about the role of the timber program in the multiple-use mandate of the national forests. One of the original objectives for creation of national forests was to provide natural resources, including timber, for the American public. The Organic Act of 1897 (partially repealed in 1976) directed the agency to manage the forests in order to "improve and protect the forest ... [and] for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States" (emphasis added). The Multiple-Use Sustained Yield Act of 1960 directs the Forest Service to administer federal lands for “outdoor recreation, range, timber, watershed, and wildlife and fish purposes.”

The National Forest Management Act (NFMA) of 1976 states that “the Secretary of Agriculture...[may sell, at not less than appraised value, trees, portions of trees, or forest products located on National Forest System Lands].” Although the heart of the Act is the land management planning process for national forests, the Act also sets policy direction for timber management and public participation in Forest Service decision-making. Under

NFMA, the Forest Service was directed to "limit the sale of timber from each national forest to a quantity equal to or less than a quantity which can be removed from such forest annually in perpetuity on a sustained-yield basis."

The NFMA directs the Forest Service to complete land management plans for all units of the National Forest System. Forest Plans are developed by an interdisciplinary team to provide for the coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness. Forest plans designate areas of national forest where different management activities and uses are considered appropriate including those areas suitable for timber harvest.

Alaska-Specific Legislation

Timber from the Tongass National Forest is being offered for sale as part of the multiple-use mission of the Forest Service identified in the public laws guiding the agency. In addition, Alaska-specific legislation and the Tongass Forest Plan direct the Forest Service to seek to provide timber to meet market demand, subject to the budget appropriations process.

Legislation unique to Alaska directs the Forest Service to maintain a commercial timber program. The Alaska National Interest Lands Conservation Act (ANILCA) and the Tongass Timber Reform Act (TTRA) provide direction on the issue of Tongass timber supply. Section 101 of TTRA amended the ANILCA timber supply mandate and fixed budget appropriations and replaced them with the following text in Section 705 (a):

Sec. 705. (a) Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act of 1976 (P.L. 94-588); except as provided in subsection (d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the annual market demand from such forest for each planning cycle."

Tongass National Forest Land and Resource Management Plan (Forest Plan, as amended)

The Record of Decision for the Tongass Land Management Plan Revision (Forest Plan) was signed by the Alaska Regional Forester in 1997. The Forest Plan incorporated new resource information and scientific studies and reflected an extensive public involvement process.

There was direction to supplement the 1997 Final EIS to evaluate and consider roadless areas within the Tongass for recommendation as potential wilderness areas as part of the March 2001 US District Court decision on litigation on the 1997 Forest Plan. The Record of Decision for the Supplemental Environmental Impact Statement was signed in February 2003. The No-action Alternative was selected. No additional lands were recommended for Wilderness designation and no changes were made to the Land Use Designations from the 1997 Record of Decision. The 1997 Forest Plan defines appropriate activities within each LUD. Approximately 74 percent of the Tongass is allocated to LUDs where commercial timber harvest is not allowed.

Amendments have been made to the 1997 Forest Plan, primarily to modify small Old-growth Habitat Reserves to meet Forest Plan criteria. These amendments have been accomplished with environmental analysis and are documented in decision documents. Due to those modifications, Land Use Designations (LUDs) in certain areas have changed from development LUDs that allow timber harvest to Old-growth Habitat LUD or changed from the Old-growth Habitat LUD to development LUDs. Since the plan was signed in 1997, these amendments have affected two percent of the acres designated as suitable commercial timber by re-designating them as Old-growth Habitat LUD where timber harvest is not allowed.

The effects to resources in the Final EIS for the 1997 Forest Plan were analyzed as if the full timber harvest allowed under each alternative would occur over the next decade and into the future. In that way the Forest Plan analysis displayed the maximum environmental effects that could be reasonably foreseen. Since substantially less timber volume and acres have been harvested in the first eight years of Forest Plan implementation than was analyzed, the effects on resources are expected to be less than projected in the 1997 Final EIS. The environmental effects analysis in the Forest Plan estimated 267 mmbf and 10,200 acres would be harvested per year. Forest Plan monitoring indicates that average annual harvest has been considerably less than that amount (Table A-1).

Table A-1. Projected and Actual Tongass Harvest (mmbf)[a]

Fiscal Year	Projected Harvest			Actual Harvest
	Low	Medium	High	
1998	77.3	86.0	112.2	119.8
1999	86.4	99.3	127.9	145.8
2000	95.5	115.9	142.7	146.8
2001	104.6	129.0	157.7	47.82[b]
2002	113.7	134.9	173.1	33.8
2003	122.8	140.8	188.9	50.8
2004	131.9	146.5	205.0	46
2005	131.9	152.2	221.4	49.6
2006	131.9	157.8	238.2	
2007	132.0	163.4	255.3	
Average	**112.8**	**132.6**	**182.2**	

[a] From Morse (April 2000) and Brooks and Haynes 1997.
[b] Truncated logging season due to litigation.

On August 5, 2005, the Ninth Circuit Court of Appeals ruled that a misinterpretation of the Brooks and Haynes 1997 draft timber demand projections rendered the 1997 Record of Decision for the Tongass Land Management Plan Revision arbitrary and capricious. The court of appeals remanded the matter for further proceedings consistent with the court's opinion (Natural Resources Defense Council v. U.S. Forest Service). The process of remedying the defects identified by the court of appeals will be time-consuming. Delaying the completion of this and other site-specific projects should be avoided because it would result in substantially undermining the Forest Service's ability to respond to timber demand. Timber sales within roaded areas, such as the Tuxekan Project Area, are particularly important to meet market demand. In March 2006, the notice to amend the Forest Plan to adjust the timber projections under the 1982 Planning Rule was announced. The draft EIS for the Forest Plan amendment is expected to be published in November 2006 for public review.

Appendix A – Reasons for Scheduling the Environmental Analysis for the Tuxekan Project

Allowable Sale Quantity (ASQ)

The ASQ serves as an upper limit on the amount of timber that may be offered for sale each decade as part of the regularly scheduled timber sale program. The Record of Decision for the 1997 Forest Plan states:

The maximum amount of timber that could be harvested (Allowable Sale Quantity or ASQ) during the first decade of the Forest Plan implementation is an average of 267 mmbf per year. A timber volume level less than the ASQ is likely to be offered over the next few years, given current market conditions, the transition that both the timber industry and the Forest Service are experiencing, and the current amount of appeals and litigation.

The ASQ is the maximum amount of timber that can be sustainably harvested from suitable forest lands allocated to development by the Forest Plan, in accordance with standards and guidelines and other limitations set out in the plan. It consists of two separate Non-Interchangeable Components (NICs) called NIC I and NIC II. The NIC I component includes lands that can be harvested with normal logging systems including helicopter logging with less than ¾ mile yarding distance. The NIC II component includes land that has high logging costs due to isolation or special equipment requirements. Most of these NIC II lands are presently considered economically and technically marginal.

There are two purposes of partitioning the ASQ into two components: (1) to maintain the economic sustainability of the timber resource by preventing the over-harvest of the best operable ground, and (2) to identify that portion of the timber supply that may not be harvested because of marginal economic conditions.

With regard to timber production sustainability, the decision for the 1997 Forest Plan further states:

> The timber resource will be managed for production of sawtimber and other wood products from timberlands available for sustainable timber harvest, on an even-flow, sustained-yield basis and in an economically efficient manner. The Tongass National Forest will seek to provide a timber supply sufficient to meet the annual market demand for Tongass National Forest timber and the market demand for the planning cycle.
>
> The Tongass National Forest will continue to allow timber harvest while maintaining sustained yield and multiple-use goals. The forest-wide standards and guidelines for timber include general direction to “[e]nsure that silvicultural systems other than clearcutting are considered through an appropriate project level analysis process.” However, uneven-aged management systems will be limited to areas where yarding equipment suited to selective logging can be used.

Roadless Area Conservation Rule

The January 2001 Roadless Area Conservation Rule prohibited most timber harvest and road construction in inventoried roadless areas on National Forest System lands. In July 2003, the US District Court for the District of Wyoming set aside the roadless rule and permanently enjoined its implementation. Effective January 2004, after analysis of current conditions and public comment, the Department of Agriculture amended the roadless rule so that actions on

the Tongass are not subject to the prohibitions against commercial harvest and road building in the roadless rule. Management of inventoried roadless areas on the Tongass is now governed by the 1997 Forest Plan.

In May 2005, the Forest Service adopted a rule that established a petitioning process that provides Governors the ability to request adjustments to management of inventoried roadless areas on national forests within their states. The United States District Court for the Northern District of California issued an order ,on September 20, 2006, to set aside the 2005 Rule, and reinstated the 2001 Roadless Area Conservation Rule (2001 Roadless Rule), including the Tongass Amendment to the 2001 Roadless Rule.

An analysis of the effects to roadless areas within the project area has been included as part of the analysis for this project. This project is consistent with agency policy and procedures and has been designed to meet the management direction, goals and objectives, and standards and guidelines in the Forest Plan.

How does the Forest Service Develop Forecasts about Future Timber Market Demand?

Annual Market Demand

Consistent with the provisions of the Tongass Timber Reform Act, the Tongass National Forest makes two determinations on volume to be offered. The first is an estimate on volume to be offered for the current year, based on a forecast of annual timber market demand. Annual market demand is analogous to assessing industry performance in the short-term. The general approach is to consider the timber requirements of the region's sawmills at different levels of operation and under different assumptions about market conditions and technical processing capability.

Timber inventory requirements are acknowledged and included in the timber demand forecast. These assumptions provide a basis for estimating the volume of timber likely to be processed by the industry as a whole in any given year. The volume of timber likely to be purchased is equal to the volume needed to make up any inventory shortfall in addition to the volume likely to be harvested in the coming year.

The annual market demand forecast is a methodology used to set the short-term goals for the Tongass timber sale program – it is the projected volume of Tongass timber needed to meet annual market demand. The estimated annual market demand is the volume the Forest plans to offer for sale in the current year, pending sufficient funding.

The reports Responding to the Market Demand for Tongass Timber (Morse, 2000) and Tongass National Forest Timber Sale Procedures (Morse, 2000a) document the formulas and procedures used in forecasting annual market demand. The procedures are designed to be flexible given the uncertainty associated with forecasting market conditions. This is especially difficult in Southeast Alaska because of the structural transformation underway in the timber industry. The methodology accounts for the fact that the Forest Service timber sale program cannot quickly respond to market fluctuations and allows the industry to accumulate

adequate volume under contract. The methodology includes provisions to monitor industry behavior and includes ways to adjust timber sale program levels to reflect harvest activity.

The methodology used by Morse documents the formulas and procedures used in forecasting annual demand and uses the correct demand projections from the final 1997 Brooks and Haynes report. In addition, the methodology is self-correcting based on actual experience and considers such factors as mill capacity, utilization, and volume under contract. To the extent that actual harvest is lower than projected harvest, the inventory of timber under contract builds up and the demand for new timber decreases, as long as economic volume is available. The annual demand for FY 06 is projected to be 153 mmbf. The spreadsheet displaying how this demand is calculated and a summary of the factors used in these calculations are in the project record.

The planned offer could include a combination of new, previously offered, and reconfigured timber sales. Both green timber and salvage will be components of the program. Offerings will consist of those targeted for small business qualified firms, as well as a portion of the volume being made available for the open market.

Market Demand over the Planning Cycle

The second level of market demand is for the volume needed over a planning cycle. To keep the planning cycle demand current, each fiscal year the timber sale plan is updated for each Ranger District, whereby the current year is dropped at the end of the fiscal year and a new year is added. These plans from the Ranger Districts are then consolidated into the Tongass Timber Sale Plan. In the past, the Tongass prepared a 10-year timber sale plan. For several reasons, in FY 06, a 5-year timber sale plan was prepared, which is consistent with Forest Service Manual 2430. The reasons for using a 5-year timber sale plan include: (1) the difficulty of projecting changing market conditions, (2) the outcome of timber harvest decisions affected by litigation, and (3) the time it will take to remedy the Forest Plan to be consistent with the court's opinion (Natural Resources Defense Council v. U.S. Forest Service). This shorter plan will contain more accurate information for potential purchasers based on completed and ongoing environmental analyses and provide a plan that is easier to adjust as market conditions fluctuate.

Demand projections are important for timber sale program planning. They provide guidance to the Forest Service to request budgets, to make decisions about workforce and facilities, and to indicate the need to begin new environmental analysis for future program offerings. They also provide a basis for expectations regarding future harvest, and thus provide an important source of information for establishing the schedule of probable future sale offerings. The weight given to the projections will vary depending on a number of factors, such as how recently they were done and how well they appear to have accounted for recent, site-specific events in the timber market.

What Steps Must Be Completed to Prepare a Sale for Offer?

The Tongass National Forest's timber sale program is complex. A number of projects are underway at any given point in time, each of which may be in a different stage of planning and preparation. A system of checkpoints, or "gates" (Forest Service Handbook 2409.18, Chapter 10), helps the Forest Service track the accomplishments of each stage of a project from inception to contract termination.

Gate 1 – Initial Planning of Timber Sale Project

A Timber Sale Project Plan, often referred to as a Position Statement, is a brief analysis of the project area with the intent of determining the feasibility of a potential timber sale. After the Position Statement is developed, the Forest Service decides whether the project area merits continued investment of time and funds in sale planning.

Gate 2 – Project Analysis, Sale Area Design, and Decision

This step is commonly referred to as the "NEPA" phase and includes field work, public scoping, analysis, draft disclosure of the effects of the project on the environment, public comment, final analysis and disclosure, decision, and potentially administrative appeals and litigation. Gate 2 activities are generally completed 2 to 3 years before a sale is offered. Legislation, policy changes, and appeals and litigation have recently extended completion of some projects for a much longer timeframe, often doubling the desired time frame.

Gate 3 – Preparation of a Timber Sale

During this step, the information and direction included in the decision document from Gate 2 is used to layout units and design roads on the ground. Additional site-specific information is collected at this time. In order to maintain an orderly flow of sales, Gate 3 activities should be completed 1 to 3 years before a sale is offered.

Gate 4 – Advertise a Timber Sale

The costs and value associated with the timber sale designed in Gate 3 are appraised and packaged in a timber sale contract. The contract is a legally binding document that tells a prospective timber sale purchaser how the sale must be harvested to conform to the project decision document. This step occurs during the final year of the project development and culminates with the advertisement of the project for sale.

Gate 5 – Bid Opening

Gate 5 is completed with the opening of bids for the project. If a bid is submitted, contractual provisions govern when the award of the sale takes place, when the sale will be completed (contract length and operation season), and how timber removal is to occur.

Gate 6 – Award a Timber Sale Contract

Gate 6 is the formal designation of a contract between a bidder and the Forest Service.

How does the Forest Service Maintain an Orderly and Predictable Timber Sale Program?

Pools of Timber (Pipeline Volume)

As discussed earlier, the Forest Service tracks the accomplishment of the different steps of development of each timber sale with the Gate System process. From a timber sale program standpoint, it is also necessary to track and manage multiple projects through a "pipeline" of time as projects collectively move through the Gate System. Because of the timeframes needed to accomplish a given timber sale and the complexities inherent in timber sale project and program development, it is necessary to track various timber sale program volumes from Gate 1 through Gate 6.

The goal of the Tongass National Forest is to provide an even flow of timber sale offerings on a sustained yield basis to meet market demand. In recent years, this has been difficult to accomplish due to a combination of uncertainties such as delays related to appeals and litigation; changing economic factors, such as rapid market fluctuations; and industry related factors, such as changes in timber industry processing capabilities. To achieve an even flow of timber sale offerings, 'pools' of volume in various stages of the Gate System are maintained so volume offered can be balanced against current year demand and market cycle projections.

Today, upward trends in demand are resolved by moving out-year timber projects forward, which may leave later years not capable of meeting the needs of the industry. In other instances, a number of new projects are started based on today's market but will not be available for a number of years. By the time the added projects are ready for offer, the market and demand for this volume may have changed. Three pools of timber volume are tracked to achieve an even flow of timber sale offerings.

The objective of the timber pools concept is to maintain sufficient volume in preparation and under contract to be able to respond to yearly fluctuations in a timely manner. Refer to Table A-2, which displays the current estimated volume in each pool, as well as the goal for volume to be maintained in each pool, based on historic patterns. Based on historic patterns, the Tongass has established a goal for the volume to be maintained in each of the timber pools. Appeals and litigation can cause timber sale projects to be reevaluated to ensure they meet current standards and direction, which can cause delays in making projects available to move through the pools, thereby not fully meeting the goals for volumes in each pool.

Pool 1 - Timber Volume Under Analysis (Gate 1 and Gate 2)

Volume in Gate 1, the initial planning step, represents a large amount of volume, but represents a relatively low investment in each project. This relatively low investment level

offers the timber program manager a higher degree of flexibility and thus, does not greatly influence the flow of volume through the pipeline.

Gate 2, timber volume under environmental analysis, includes sales being analyzed and undergoing public comment through the NEPA process. This pool includes any project that has started the scoping process through those projects ready to have a decision issued. In addition, tracking how much volume is involved in appeals or litigation may be necessary to determine possible effects on the flow of potential timber sales. Volume in appeals and litigation is tracked as a subset of this pool as necessary (Table A-3).

Based on historic patterns, the Tongass has established a goal for the pipeline volume to be maintained in each of the timber pools. The goal for Pool 1 is to be maintained at approximately 4.5 times the amount of the projected harvest to account for projects at various stages of analysis. That goal reflects a number of factors which can lead to a decrease in volume available, such as a decision in Gate 1 to drop further analysis in a particular planning area (called the "no go" decision), a falldown in estimated volume between Gate 1 and Gate 2, and volume not available for harvest due to appeals or litigation.

Table A-2. Accomplishments in Gate System and Timber Pools (mmbf)

Pipeline Pool Volume	Goal	FY 06 (as of 11/10/05)
Pool 1	5941[a]	309
Volume Under Analysis	1722 [b]	2393 [c]
(Gate 1 and 2)	3964 [d]	745 [e]

[a] The goal for volume under analysis is approximately 4.5 times the projected harvest for the current year (132 mmbf for 2006 based on PNW estimates). Volume under analysis includes all volume in projects from the Notice of Intent through completion of the environmental analysis for sales planned.

[b] The goal for volume available for sale is to have at least 1.3 times the projected harvest for the current year (132 mmbf) in sales that have approved NEPA and completion of timber sale preparation.

[c] Includes volume from sales mutually cancelled under the provision of the 2004 Appropriations Act (Sec. 339). However, much of this volume appraises deficit and could not be offered for sale under Congressional direction in the 2006 Appropriations Act (Public Law 109-54, Sec. 416). Does not include volume under litigation – see Table A-3.

[d] The goal for volume under contract is for purchasers to have 3 times the volume under contract as projected for harvest for the current year (132 mmbf). Does not include volume for FY 05 offerings (58 mmbf) that have received bids but have not been awarded or sales that have had mutual cancellation requests granted.

[e] Estimated volume under contract available for harvest (not including timber enjoined from harvest).

Pool 2 - Timber Volume Available for Sale (Gates 3, 4 and 5)

Timber volume available for sale includes sales for which environmental analysis has been completed, and have had any administrative appeals and litigation resolved. Enough volume in this pool is needed to be maintained to be able to schedule future sale offerings of the size and configuration that best meets market needs in an orderly manner.

As a matter of policy and sound business practice, the Forest Service announces probable future sale offerings through the Periodic Timber Sale Announcement. Recent delays at Gate 2 have affected sale preparation and have made scheduling uncertain. At Gate 4, sales have been fully prepared and appraised, and are available to managers to advertise for sale. This

allows potential purchasers an opportunity to do their own evaluations of these offerings to determine whether to bid, and if so, at what level.

Timber in this pool can include a combination of new sales, previously offered unsold sales, and remaining volume from cancelled sales. The goal is to maintain Pool 2 at approximately 1.3 times the amount of the projected harvest to allow flexibility in offering sales.

Table A-3. Timber Volume Involved in Appeals and/or Litigation [a]

Timber volume remanded on appeals [b]	35 mmbf
Timber volume involved with litigation	215 mmbf
Timber volume under contract enjoined from implementation	12 mmbf

[a] As of November 10, 2005

[b] Remanded – Decision overturned during internal review. Does not include volume in decisions currently in the appeal period or undergoing an appeal.

Pool 3 - Timber Volume under Contract (Gate 6)

Timber volume under contract contains sales that have been sold and a contract awarded to a purchaser, but which have not yet been fully harvested. Contract length is based on the amount of timber in the sale, the current timber demand, and takes into account the accessibility of the area for mobilization. The longer the contract period, the more flexibility the operator has to remove the timber based on market fluctuations. Timber contracts typically initially give the purchaser three years to harvest and remove the timber purchased. Analysis of recent Tongass timber sales indicates an average sale length of about six years.

The Tongass attempts to maintain roughly three years of unharvested volume under contract to the industry as a whole. This volume of timber is the industry's dependable timber supply, which allows adaptability for business decisions. This practice is not limited to the Alaska Region, but is particularly pertinent to Alaska because of the nature of the land base. The relative absence of roads, the island geography, the steep terrain, and the consequent isolation of much of the timber land means that timber purchasers need longer-than-average lead times to plan operations, stage equipment, set up camps, and construct roads prior to beginning harvest.

A combination of projected harvest and projected demand is used to estimate the volume needed to maintain an even flow timber sale program. As purchasers harvest timber, they deplete the volume under contract. Timber harvest is then planned and offered by the agency as sales that give the industry the opportunity to replace this volume and build or maintain their working inventory. Although there will be variation for practical reasons from year to year, in the long run over both the high points and low points of the market cycle, the volume harvested will equal the timber volume sold.

The goal for Pool 3, volume under contract, is to maintain at approximately three times the amount of projected harvest to allow the purchasers to have a continuous supply of timber volume available for harvest so they can plan their operations.

How Appeals and Litigation affect the timber sale program

Timber harvest projects require site-specific environmental analysis that usually is documented in an environmental assessment (EA) or an environmental impact statement

(EIS). The public is notified of the analysis and is provided the opportunity to comment on proposals and file an appeal on decisions. The appeal process for most timber harvest projects takes up to 105 days before implementation to occur.

When decisions are appealed and affirmed through the appeal process, the project can still be litigated. Litigation can be a lengthy process. Although litigation does not preclude offering timber for sale, the Forest Service and potential purchasers are often reluctant to enter into a contract where the outcome is uncertain. Two sales within the last year were enjoined from harvest after the contracts were awarded. The outcome of litigation affects the Forest's ability to provide a reliable timber supply.

How Does the Forest Service Decide Where Timber Harvest Projects should be Located?

The location of timber sale projects is based first on the land allocation decisions in the Forest Plan. Under the 1997 Forest Plan, lands designated for possible timber harvest are in the development Land Use Designations (LUDs), primarily the Timber Production, Modified Landscape, and Scenic Viewshed Land Use Designations.

Timber Resource Land Suitability

The second consideration is the suitability of the land for timber production. Many acres within the development LUDs are not suitable for timber production due to poor soils or steep slopes. The process for determining the suitability of the land is found in the Forest Plan, Appendix A. Figure A-1 depicts the classification of all the lands within the Tongass National Forest. Four percent of the Tongass land base, the suitable, available, and scheduled forest land, provides the land base for the Allowable Sale Quantity of 267 mmbf per year. Under the 1997 Forest Plan, the remainder of the land, approximately 96 percent, does not allow, is not scheduled, or is not physically suitable.

Non-Forest land (41 percent) – Land that has never supported forests, e.g. muskeg, rock, ice, etc.

Withdrawn Lands (25 percent) – Lands designated by Congress, the Secretary of Agriculture, or Chief for purposes that preclude timber harvest, e.g. Wilderness Areas.

Non-productive Forest (14 percent) – Forest land not capable of producing commercial wood on a sustained yield basis.

Productive Forest, Not suitable, Physical Attributes (6 percent) – Forest land unsuitable for timber due to physical attributes (steep slopes, soils, etc.) and/or inadequate information to ensure restocking of trees within five years of final harvest.

Productive Forest, Not Suitable, Non-development LUD (8 percent) – Productive forest lands where timber production is not allowed due to Forest Plan land use designation, e.g. Semi-Remote Recreation, Old-growth Habitat, etc.

Productive Forest, Suitable and Available, Scheduled (4 percent) – Forest land that meets all the criteria for timber production suitability and is available and is scheduled by the Forest Plan over the planning horizon.

Productive Forest Suitable and Available Unscheduled (2 percent) – Forest land that meets all the criteria for timber production suitability, is available for harvest, however was not scheduled in the Forest Plan model for harvest.

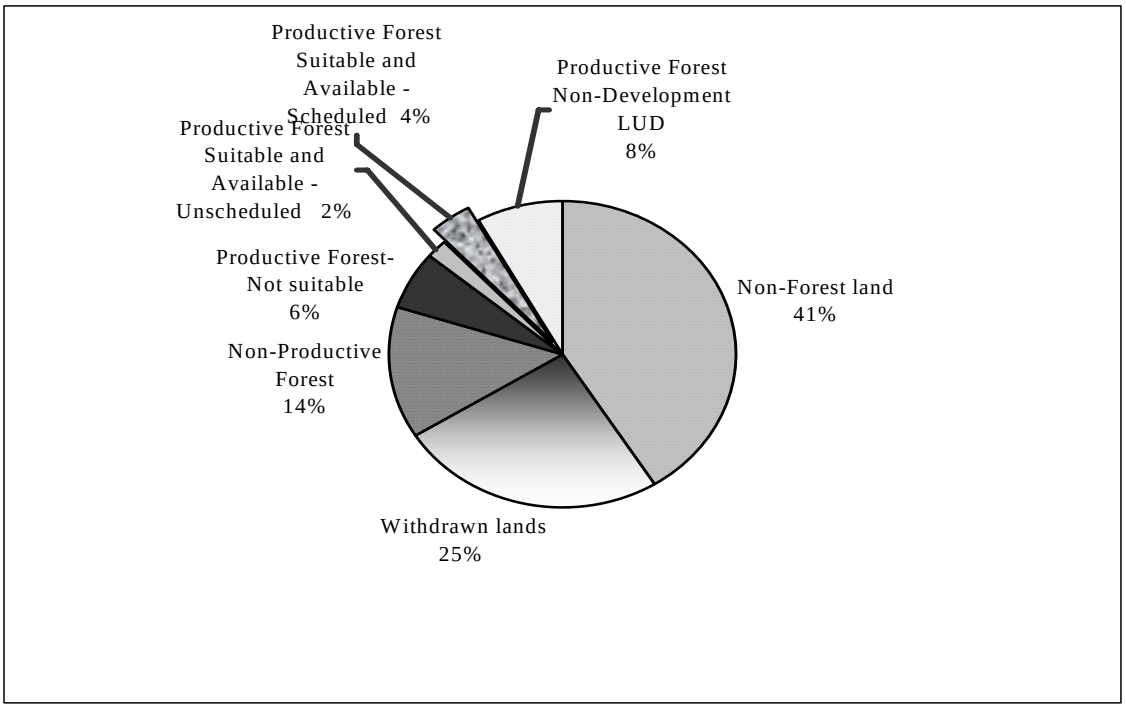

Figure A-1 1997 Forest Plan Timber Resource Suitability Analysis

District-Level Planning

The Tongass National Forest is divided into ten ranger districts. For planning and scheduling purposes, the allowable sale quantity has been allocated to the ranger districts based on the Forest Plan modeling (FORPLAN) results of suitable and available acreage. The average annual distribution of the full Forest Plan allowable sale quantity by ranger districts is displayed in Table A-4 (all volumes are identified as sawlog plus utility).

The Forest Supervisor for the Tongass National Forest is responsible for the overall management of the Forest's timber sale program. Included within these responsibilities is making the determination on the amount of timber volume to be made available to industry. Whether or not sufficient funding is appropriated to attain the program is the responsibility of the Congress and the President.

Table A-4. Annual Project Distribution of Forest Plan Allowable Sale Quantity (mmbf)

Ranger District	Non-Interchangeable Component (NIC)	
	NIC I[a]	NIC II[b]
Ketchikan/Misty Fiords	32	7
Thorne Bay	42	9
Craig	33	7
Wrangell	28	6
Petersburg	50	9
Sitka	17	4
Hoonah	7	2
Juneau	7	2
Yakutat	4	1
Admiralty National Monument	0	0
NIC Totals	**220**	**47**
ASQ Total(mmbf)	**267**	

[a] NIC I component – lands that can be harvested with normal logging systems including helicopter logging with less than ¾ mile yarding distance.

[b] NIC II component – includes land that has higher logging costs due to isolation or special equipment requirements.

While the Congressional appropriation process is taking place, the Tongass Forest Supervisor directs the District Rangers to develop a timber sale plan that is the best estimation of the potential timber harvest projects to attain the prescribed offer level for the current year based on annual market demand, as well as developing a timber program for the planning cycle, based on the NIC I average for the ranger districts. The offer level for the current year in this plan is based, to the extent possible, on the forecasted annual market demand. Demand may fluctuate from year to year but recent years have shown little change in the annual demand projection. Offerings may vary from year to year but recently they have been in the low market scenario range, as determined by the projected annual demand.

The District Ranger is responsible for identifying and recommending the project areas for the timber sale plan. The Ranger's role is to develop and recommend to the Forest Supervisor timber harvest projects that meet Forest Plan goals and objectives. Districts work on various timber sale projects simultaneously, resulting in continual movement of projects through the stages of the timber program pipeline. This schedule allows the necessary time to complete preliminary analysis, resource inventories, environmental documentation, field layout preparations and permit acquisition, appraisal of timber resource values, advertisement of sale characteristics for potential bidders, bid opening, and physical award of the timber sale. Project delays through the completion of Gate 2 attributable to legal injunctions and litigation has affected the offer level in recent years. Once all of the Rangers' recommendations are made and compiled into a consolidated schedule, the Forest Supervisor is responsible for the review and approval of the final timber sale plan.

Some of the considerations the District Ranger takes into account for each project include:

- The project area contains a sufficient number of suitable timber production acres allocated to development LUDs Available information should indicate that the timber volume being considered for harvest can be achieved while meeting Forest Plan goals, objectives, and standards and guidelines.

- Other resource uses and potential future uses of the area and of adjacent areas and of non-National Forest System lands.
- Areas where the investment necessary for project infrastructure (roads, bridges, etc) is achievable with the estimated value of timber volume in the project area. Where infrastructure already exists, the project would allow any maintenance and upgrade of the facilities necessary for removal of timber volume.
- Areas where investments for the project coincide with long-term management based on Forest Plan Direction.

The implementation of the sales on the timber sale plan depends in part on the final budget appropriation to the agency. In the event insufficient budget is allocated, or resolution of pending litigation or other factors delay planned sales, timber sale projects are selected and implemented on a priority basis. Generally, the higher priority projects include sales where investments such as road networks, camps, or log transfer facilities have already been established or where land management status is not under dispute. The distribution of sales across the Tongass is also taken into account to distribute the effects of sales and to provide sales in proximity to timber processing facilities. Timber sale projects scheduled for the current year that are not implemented, or the remaining volume of sales that are only partially implemented, are shifted to future years in the plan. The sale plan becomes very dynamic in nature due to the number of influences on each district.

The Tuxekan Project meets all laws and regulations governing the removal of timber from National Forest System lands, including Forest Service policies as described in Forest Service manuals and handbooks and the 1997 Forest Plan and ROD. Based on current year and anticipated future timber volume demand and the timber supply provisions of the Tongass Timber Reform Act, the analysis of the Tuxekan Project is prudent at this time to meet timber sale needs as reflected in the Five Year Timber Sale Plan. The anticipated budget allocations and the availability of resources are sufficient to prepare and offer this project for sale as scheduled.

How Does This Project Fit into the Tongass Timber Program?

The Tuxekan Project is currently in Gate 2, Project Analysis. The amount of volume considered for harvest under the action alternatives ranges from 12.4 to 20.2 (million board feet) mmbf, which would contribute to the Tongass timber sale program. A no-action alternative is also analyzed in this EIS. If an action alternative is selected in the decision for the Tuxekan Project, this volume will be added to the volume available for sale.

As described in the Pools of Timber section of this appendix, the volume of timber needed to maintain Pool 1 is 4.5 times the amount of the projected harvest to account for projects at varying stages of analysis for that year. As displayed in Table A-2, the goal for volume under analysis is 5,941 mmbf. Currently, the forest-wide volume under analysis (Pool 1) is about 309 mmbf and includes the volume for this project. The Tuxekan Project contributes to timber sale program planning objectives to meet the goal of providing an orderly flow of timber from the Tongass on a sustained yield basis to meet timber supply requirements. It is reasonable to be conducting the environmental analysis for this project at this time. The Tuxekan Project is currently proposed for offer in Fiscal Year 2006.

Why is this Project Occurring in this Location?

As explained above, timber harvest project areas are selected for environmental analysis for a variety of reasons. The reasons this project is being considered in this area include:

- The Tuxekan Project Area contains sufficient acres of suitable and available forest land to make this timber harvest proposal reasonable. Areas with available timber need to be considered for harvest in order to seek to provide a supply of timber from the Tongass National Forest that (1) meets the annual market demand from such forest, and (2) meets the market demand from such forest for each planning cycle, pursuant to Section 101 of the Tongass Timber Reform Act (TTRA).
- A road system and log transfer facility are already in place to provide access to proposed timber harvest units, and to transport the harvested logs to mills for processing.

Providing substantially less timber volume than required to meet Forest Plan and TTRA Section 101 timber supply and employment objectives in order to avoid harvest in the project area is not necessary or reasonable.

Effects on subsistence resources from timber harvest are projected to have few differences based on the sequence in which areas are harvested. Harvesting other areas with available timber on the Tongass National Forest would be expected to have greater potential effects on subsistence resources because of the relatively low level of subsistence harvest in the Tuxekan Project Area. Harvest within other areas is foreseeable under the Forest Plan.

Conclusion

There is a long legislative recognition that timber harvest is one of the appropriate activities on national forests, starting with the founding legislation for national forests in 1897. The National Forest Organic Act provides that national forests may be established “to improve and protect the forest within the boundaries of, or for the purposes of securing favorable conditions of water flows and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States.”

Congress’s policy for national forests, as stated in the Multiple-Use Sustained Yield Act of 1960, is “the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.” Accordingly, Congress has authorized the Secretary of Agriculture to sell trees and forest products from the national forests “at no less than appraised value.” The National Forest Management Act directs that forest plans shall “provide for multiple use and sustained yield, and in particular, include coordination of outdoor recreation, range, timber, watershed, wildlife, fish, and wilderness.”

In addition to nationwide statutes, section 101 of the Tongass Timber Reform Act directs the Forest Service to seek to meet market demand for timber from the Tongass, subject to certain qualifications. It is the goal of the Tongass National Forest to provide an even flow of timber on a sustained yield basis and in an economically efficient manner. The amount of timber offered for sale each year is based on the objective of offering enough volume for sale to meet the projected annual demand. That annual demand projection starts with installed mill capacity, and then looks to industry rate of capacity utilization under different market

scenarios, the volume under contract, and a number of other factors, including anticipated harvest and the range of expected timber purchases.

As described by Morse (April 2000), in terms of short-term economic consequences, oversupplying the market is less damaging than undersupplying it. If more timber is offered than purchased in a given year, the unsold volume is still available for re-offer in future years. The unsold volume would have no environmental effects because it would not be harvested. Conversely, a short fall in the supply of timber can be financially devastating to the industry. The Tuxekan Project could supply from 12.4 to 20.2 mmbf of volume for sale, with harvest potentially beginning in 2006.

Appendix B – Unit Cards

Unit cards are located in the Record of Decision (ROD) as Appendix 1
(Click here for link)

Appendix C – Road Cards

Road cards are located in the Record of Decision (ROD) as Appendix 2
(Click here for link)

Appendix E – Other Activities and Potential Sale Area Improvement Plans
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Other Activities and Potential Sale Area Improvement Plans

Introduction

Other activities proposed in addition to those proposed in the action alternatives include necessary monitoring and reforestation activities to meet National Forest Management Act (NFMA) requirements. Reforestation activities associated with timber harvest units are deemed 'essential reforestation' while non-reforestation activities are termed 'other activities' and receive a lower priority for limited funding in a Sale Area Improvement (SAI) Plan. All SAI Plan activities must fall within the SAI Plan boundary established for the timber sale, must be NEPA approved and must be accomplished within the five-year SAI Plan life (FSH 2409.19-2004-2, effective 03/08/2004). For essential reforestation and harvest evaluation site specific detail, refer to the individual unit prescriptions.

Natural Regeneration Surveys and Certification

Objective

Surveys would be conducted three growing seasons following harvest to ensure that levels of natural stocking are satisfactory and within the NFMA time frame of five years following harvest.

Treatment

The objective of the surveys is to monitor the occurrence of natural regeneration stocking following harvest. Direction in FSH 2409.17 calls for stocking levels of 300 trees per acre with 60 percent stocked plots by the fifth growing season following final treatment of a regeneration harvest (USDA Forest Practices 1985). These surveys would be conducted in the harvested portion of a clearcut with reserves and in the small multi-tree gaps created by single tree selection and single tree selection with reserves.

The stand would be certified as regenerated if the criteria are met (stocking levels of 300 trees per acre with 60 percent stocked plots after the third growing season following final treatment). Work would also include inputting data into the SIS, updating the GIS, updating the Sale Area Improvement (SAI) Plan, and modifying prescriptions to reflect stand changes. This work is required by the National Forest Management Act (NFMA).

SAI Plan Evaluation

Reforestation activities associated with timber harvest are covered under the timber sale SAI Plan as essential reforestation.

Cone Collection

Objective

The objective is to collect an adequate amount of seed from seed zone 4, Prince of Wales and adjacent islands, to accomplish required artificial regeneration.

Treatment

Seed would be collected from phenotypically superior trees that exhibit desirable characteristics such as form, height, branch angle, and resistance to insects and disease. Fill-in planting might require approximately 200 trees per acre. Most planting would prescribe yellow cedar but some Sitka spruce or redcedar might also be prescribed.

For yellow cedar, approximately 40,000 seedlings can be produced per pound of clean seed. Therefore 0.5 pound of clean seed or 2.5 bushels of cones must me collected (five bushels per one pound of seed). This amount should be rounded to three bushels assuming poor cone years. Redcedar seeds weigh about the same; Sitka spruce seeds weigh more. Cone collection would occur in moderate or good cone collecting years based on field surveys. Force account crews would make collections in the fall after the cones have matured. Collection would involve identifying phenotypically superior trees; felling the tree; picking, cleaning, and bagging the cones; tagging the bags; and transporting the cones to Petersburg where the seed would be stored until needed.

SAI Plan Evaluation

Reforestation activities associated with timber harvest are covered under the timber sale SAI Plan as essential reforestation

Artificial Reforestation

Objective/Justification

The objective is to maintain species diversity within the stands by planting yellow cedar and/or redcedar and to assure stocking on marginal sites. Natural yellow cedar restocking may be minimal because of several factors.

1. A limited distance of seed dispersal (300 to 400 feet)
2. Infrequent cone crops and low germination rates
3. Lack of advance regeneration under the old-growth canopy because of shade intolerance
4. Competition from other coniferous seedlings
5. Heavy slash accumulations due to low-volume stands

Planting would occur mainly on high-elevation, low-quality sites where yellow cedar occupies a portion of the site. Redcedar would be planted in wetter, poor-quality sites. 1-0 seedlings grown from local seed would be used. Associated planting projects would include updating the SIS/GIS and SAI Plan and modifying prescriptions to reflect stand changes. There are three general categories of sites to be planted.

1. **Floodplains and Alluvial Fans.** These areas usually have deep, well-drained soils with poorly developed horizons due to periodic flooding. Mature stands rarely support more than 100 to 150 stems per acre. Species composition is primarily spruce growing on raised hummocks. Disturbance results in heavy brush competition (alder, salmonberry, and devils club) that will delay natural regeneration and suppress tree growth for a period of 5 to 20 years following harvest. The vast majority of the Tonowek and Tuxekan soil series have been excluded from harvesting in recent years. No harvest is proposed on large areas of these sites; however, small inclusions might need regeneration established by artificial means. Existing sites would be planted with Sitka spruce or cedar, depending on the original stand composition.

2. **Dense Brush or Inadequate Seed Source.** Sparsely stocked sites with an established groundcover of dense vegetation such as salmonberry or devils club will retard stocking and growth for at least 5 to 10 years. Sites lacking a satisfactory seed source, including high-elevation sites, sites adjacent to muskegs or lakes, and immature stands where natural regeneration cannot be ensured or even reasonably expected within five years of harvest, would be planted with Sitka spruce or cedar.

3. **Somewhat Poorly Drained to Poorly Drained Soils, Low-Productivity Cedar Sites.** These sites currently support decadent, low-quality sawtimber with cedar making up at least ten percent of the canopy. Natural regeneration of cedar on these sites is unlikely for several reasons.

    a. Cedar has limited capabilities to disperse seed over long distances from the parent tree. Yellow cedar seed dispersion is limited to 300 to 400 feet.

    b. Yellow cedar is not a prolific seed producer. Cone crops are infrequent and germination rates are low.

    c. Unlike cedar in other locations, yellow cedar in this area displays a greater degree of intolerance to shade. Local cedar is unable to regenerate under its own canopy, and advance cedar reproduction is generally absent on the forest floor.

    d. Low-volume cedar stands often result in heavy slash accumulation, which can inhibit natural reproduction.

Planting of redcedar or yellow cedar to improve productivity and maintain tree species diversity would be addressed in the silvicultural prescription for cedar stands.

Treatment

Floodplains/alluvial fans and dense shrub/inadequate seed source planting areas would be planted with 1-0 Sitka spruce stock. The low-productivity cedar sites would be planted with 1-0 redcedar or yellow cedar. Generally a mixture of redcedar and yellow cedar would be planted on sites below 800 foot elevation on north and east aspects and below 1,000 feet on south and west aspects. Cedar sites with elevations above those listed have been scheduled

for yellow cedar planting only. All areas scheduled for planting will be evaluated for actual planting needs soon after harvest.

SAI Plan Evaluation

Reforestation activities associated with timber harvest are covered under the timber sale SAI Plan as essential reforestation.

Plantation First Year Survival Examination

Objective/Justification

Anticipated planting on this project area would be examined following the first growing season after planting.

Treatment

The examination would determine seedling survival, growth, and the need for replanting and reforestation certification. Stake rows would be established to measure the survival. Costs for this first year survival examination would also include inputting data into the SIS, updating the GIS and SAI Plan, and modifying prescriptions to reflect stand change. This work is required by NFMA.

SAI Plan Evaluation

Reforestation activities associated with timber harvest are covered under the timber sale SAI Plan as essential reforestation.

Plantation Third Year Survival Examination and Certification

Objective/Justification

The first year survival examination would be repeated in the third growing season after planting.

Treatment

The same stake rows from the first year examination would be used to certify that the unit is fully stocked.

SAI Plan Evaluation

Reforestation activities associated with timber harvest are covered under the timber sale SAI Plan as essential reforestation.

Timber Harvest Evaluation

Objective/Justification

Harvest evaluations are desired to assess implementation success of prescriptions and effects on regeneration when alternative harvest methods (single tree selection and commercial thinning) have been used. The use of harvest techniques that incorporate selection harvest methods, retention of overstory structure, leave islands, and leave strips has been limited in Southeast Alaska to date. The degree of success in implementing such prescriptions should be evaluated to determine how effective these prescriptions are in meeting multiple goals and objectives. If implemented properly, and found to be successful in meeting goals and objectives, such prescriptions could be applied on a much broader basis to meet goals and objectives for ecosystem management. Such evaluations may include, or be primarily focused on, reforestation needs.

Treatment

A certified silviculturist or others specifically trained for the task under the direction of a certified silviculturist would perform harvest evaluation. Treatments that result in a predicted need for artificial reforestation, incorporate selection harvest methods, residual tree retention, leave areas, leave islands, or other nonclearcut treatments would be evaluated as soon after harvest as practical, but no less than two years following harvest. Evaluations would consist of a walkthrough or quick plot stand examination of the treatment area, during which measurements would be taken for comparisons between expected and actual treatment results. If the prescriptions called for leaving 42 merchantable trees per acre, measurements would be taken for comparison with what was prescribed and anticipated. The prescription would be used as a baseline for comparison with actual on-the-ground results. Emphasis should be placed on evaluating why merchantable trees, intended for retention, were damaged or lost. A harvest evaluation report would be produced that compares prescriptive treatments and expected results with implemented treatment and actual results. Recommendations for adjusting future prescriptions, where appropriate, would be included in this report. Note that harvest evaluations with a primary focus on reforestation are deemed essential reforestation activities, and will be required under the SAI Plan for the unit or sale.

SAI Plan Evaluation

Harvest evaluations can be directly tied to reforestation issues, such as determining the actual need for planting. Evaluations tied directly to reforestation issues are deemed essential reforestation. These evaluations may also be prescribed to assess prescription implementation. Where there is no direct tie to reforestation issues, these evaluations are considered other projects under an SAI Plan.

Wildlife Seeding of NFS Roads

Objective/Justification

Provide forage for Sitka black-tailed deer and black bear in and adjacent to harvest units. This objective is consistent with regional and Forest direction to maintain wildlife habitat capability. Seeding should occur in the initial years after timber harvest, before there is much vegetation growth or inhibiting alder growth in the harvest units.

Treatment

The log purchaser would be responsible for seeding all temporary roads and landings used during the sale. All newly constructed NFS roads would be stored after harvest activities are completed. Seeding would occur as the roads are being stored. All existing roads being decommissioned and a portion of the existing roads being stored would be seeded to provide forage for wildlife. Seeding would be a mixture of native seed, if available. Fertilizer and urea would also be applied at the same time as the seed. Application would be done during the timing window to allow adequate growth.

SAI Plan Evaluation

Seeding of roads for wildlife that are no or are no longer the responsibility of the timber sale purchaser may be included in timber sale SAI Plans.

Fish Passage Restoration

Objective

Restore fish passage as funding becomes available at two road crossings identified by the road condition survey as being a barrier or potential barrier to fish migration. The two stream crossings categorized as “red” - impassible are located in Watersheds 7 and 12. The impassible culvert in Watershed 7 is located near the outlet of ADF&G cataloged stream 103-90-10980 on road 1470000, with approximately 0.5 miles of coho habitat upstream of this culvert. The second culvert in Watershed 12 blocks upstream migration in ADF&G cataloged stream 103-90-10895, blocking approximately ½ mile of upstream coho and pink salmon habitat. Follow up surveys may reveal other crossings that require repair or replacement to meet fish passage standards as well.

Treatment

- Replace the culvert on road 1470000 in Watershed 7 with either a bridge or arched culvert. Approximately $90,000 was estimated in the RCS database to survey and implement depending on exact design.

- Replace the culvert on road1470000 in Watershed 12 with either a bridge or arched culvert. A cost was not estimated in the RCS database, thus an estimate of $90,000 is projected to survey and implement depending on exact design.

In addition, repair or replace drainage structures that are blocked, partially blocked, or are otherwise not facilitating fish passage. Ongoing activity is approximately $60,000 a year.

All of these projects need additional field review.

SAI Plan Evaluation

As with road restoration and maintenance activities, fish passage issues (improperly functioning culverts) that are not or are not the responsibility of the timber sale purchaser may be included in SAI Plans as other projects.

Riparian Area Rehabilitation

Objectives

Return RMAs that have been previously disturbed, and fish habitat to a more natural state of function and structure by stabilizing stream banks and channels and by providing large woody debris (LWD), when appropriate. Also, prioritize rehabilitation projects with associated costs to facilitate implementation as funding from various sources becomes available.

These objectives would be accomplished by a combination of releasing existing sapling / pole aged conifers within the riparian area, under planting and restoring LWD to stream channels and flood plains. Restoration of riparian areas would in the long term provide a self-sustaining source of LWD, provide for and maintain sediment storage, bank stability, flood plains and off channel connectivity and fish habitat complexity and diversity.

Treatments

The first phase of riparian rehabilitation would be single tree release of existing conifers. Over story canopy would be reduced to allow a minimum of 40 percent full sunlight. Each conifer would be individually selected with the surrounding alder thinned to space trees at least 9 meters (30 feet). Additional areas would be selected to create larger 0.2 hectare (0.5 acre) and then planted with cedar and hemlock to diversify the stand. Cost would range from $500-$1,000/acre for riparian treatments.

Overstory reduction would stimulate the growth of the understory (salmonberry) and therefore each released tree would need to have brush manually cut [1.8-3.0 meters (6-10 feet)] annually in June or July. Understory management should continue until 30 percent of the released conifer crown exceeds the height of salmonberry [~2.5 meters (8 feet)]. Estimated cost are ~$150/acre.

During the second phase, in-stream and flood plain key LWD levels would be increased in a range from 4 to 82 pieces/1,000 m2 based on channel type or process group to meet Tongass Forest Plan fish habitat objectives. Increasing LWD within the stream channel and flood

plain would in the short term (immediately after implementation) restore key LWD levels to historic/reference conditions. Restoration of LWD would maintain stream processes and fish habitat in the interim, until riparian areas recover and again begin to naturally contribute LWD. Reintroduced LWD would be site specific and strategically placed to meet the following objectives: i) store sediment and reconnect flood plains, ii) route sediment and scour pools, iii) reduce bank erosion, iv) reduce low flow and bankfull width/depth ratios, v) retain nutrients, vi) increase hiding cover for salmonids and vii) protect early successional riparian vegetation. Cost range from $33,000/rivermile to $120,000/rivermile.

Evaluation

Evaluate effectiveness of treatments 3 and 5 years after application. Evaluate buffers and other measures prescribed to protect fish habitat and minimize sediment delivery.

SAI Plan Evaluation

Activities as proposed (above) may be included in SAI Plan for this timber sale.

Appendix D - Mitigation and Monitoring
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Note that Sale Area Improvement Plan can be found in Appendix E.

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General Mitigation

In addition to the project-specific measures listed in Appendix D, a variety of general and other site-specific measures would apply to all harvest and construction activities and would be incorporated into the timber harvest unit and road design. These include all appropriate BMPs not specifically identified below. Direction for use of BMPs on National Forest System lands in Alaska is included in Chapter 10 of the Region 10 *Soil and Water Conservation Handbook* (USDA Forest Service 1996). The handbook describes the application, monitoring, evaluation, and refinement of these BMPs. Appendix C of the Forest Plan provides a list and brief summary of the BMPs used in Region 10. Forest-wide standards and guidelines are presented in chapter 4 of the Forest Plan. Forest Plan standards and guidelines and Appendix C of the Forest Plan, are incorporated by reference (USDA Forest Service 1997a, 1997b) into this appendix.

Soil and Water Protection

Incorporate soil and water resource considerations into timber sale planning. Include site-specific considerations for site preparation; designate water quality protection needs on sale area maps, locate and design landings for good drainage and dispersion of water, incorporate erosion control and timing responsibilities into the operating schedule, schedule and enforce erosion control during and at completion of the timber sale (including nonrecurring "C" provisions to protect soil and water resources in timber sale contracts), and seek an environmental modification of the contract if new circumstances or conditions indicate that soil, water, or watershed damage may occur. (BMPs 13.1, 13.2, 13.3, 13.4, 13.10, 13.11, 13.12, 13.14, 13.17, and 13.18)

Implement measures to reduce surface erosion and drainage interruption related to transportation including water barring and cross-draining roads using ditches and culverts to prevent water running long distances over roads, closure, and seeding and fertilizing cut-and-fill slopes. (BMPs 14.1, 14.2, 14.3, 14.5, 14.7, 14.8, 14.9, 14.10, 14.11, 14.12, and 14.19)

Conduct road maintenance and snow removal operations to minimize disruption of road surfaces, embankments, ditches, and drainage facilities, and use road closures or other measures to keep road surface and road site erosion at low or background levels. (BMPs 14.20 and 14.23)

Management of Road Use to Reduce Erosion and Sedimentation

Control access and manage road use to reduce the risk of erosion and sedimentation from road surface disturbance especially during the high-risk periods associated with high runoff and spring thaw conditions. (BMP 14.22)

Temporary Road Decommissioning

Decommission temporary roads after use, remove or bypass drainage structures, and install waterbars in appropriate places. (BMPs 12.17 and 14.24)

Development of Rock Sources, MAFs, and Other Facilities

Implement measures to reduce surface erosion and other impacts on soils and water from gravel sources and quarries, MAFs, sort yards, and other facilities. (BMPs 14.18, 14.19, 14.25, 14.26, and 14.27)

Marine Access Facilities Sites

Site MAFs in locations that will best avoid or minimize potential impacts on water quality, aquatic habitat, wildlife, and other resources. (BMP 14.4)

Camp and Facility Sites

Site camps and other facilities sufficiently far from important seasonal bear concentrations, raptor nest sites, and other important wildlife habitats to avoid or minimize wildlife-human conflicts.

Sanitation at Facilities

Comply with all regulations for the disposal of sewage at camps, MAFs, and other facilities; require incinerators and/or other bear proof garbage disposal methods at work camps. (BMP 12.10, 12.15, and 12.16)

Accidental Spills

Implement measures and plans to prevent the contamination of soil and water from accidental spills of petroleum products and hazardous substances. (BMP 12.8 and 12.9)

Heritage Site Discovery

Because known sites in the project area are located far from the harvest units no site-specific mitigation plans are necessary. Some undiscovered sites may exist in the project area. Suspend work if a heritage site is discovered during project implementation. Authorize resumption of work only after consultation with the State Historic Preservation Office is complete.

Karst and Cave Inventory

Inventory karst landscapes and cave resources before initiation of project planning (including the use of dye tracing). If caves or karst features are discovered during layout or implementation, they will be reviewed by a geologist prior to continuing with harvest activities.

Maximum Size of Created Openings

Limit created openings to a maximum size of 100 acres.

Maintain Advance Regeneration

Maintain advance regeneration within the unit to meet reforestation needs and stand objectives.

Maintain Minor Tree Species

Selectively maintain minor species (e.g., yellow-cedar, western red cedar, Pacific yew), where appropriate for the site, as viable components of future stands, for vegetative diversity, and for seed trees.

Windthrow Hazards Along the Boundaries of Protected LUDs

Where the chance of windthrow in adjacent stands of LUDs that do not allow harvest is increased, measures will be taken to contain the windthrow within the LUD where timber harvest is allowed.

Certification of Reforestation

Certify that every unit that receives a final harvest meets or surpasses the stocking guidelines and certification standards (FSH 2409.17) within 5 years.

Wetland Protection

Minimize the loss of all wetlands, but particularly the higher value wetlands (especially fens), and minimize the adverse impacts of land management activities on wetlands; follow Executive Order 11990 and BMPs. (BMP 12.5)

Beach and Estuary Fringe Protection

Avoid harvest within the beach and estuary buffer; avoid road construction within this zone, except where no feasible alternative exists.

Non-development LUD Protection

Avoid timber harvest impacts and minimize road construction within non-development LUDs such as Old-growth Habitat.

Marine Mammal Protection

Ensure that Forest Service permitted or approved activities are conducted in a manner consistent with the Marine Mammal Protection Act, the Endangered Species Act, and

National Marine Fisheries Service regulations for approaching whales, dolphins, porpoises, seals, and sea lions.

Fish and Fish Habitat

The following fish and fish habitat, and riparian standard and guideline objectives are applicable to all LUDs within the project area (Forest Plan FISH112, IV, pg 4-9 to 4-10; RIP1, IIA pg 4-53). In general, maintain riparian areas in mostly natural conditions, for fish, other aquatic life, and old-growth and riparian plant and wildlife species:

- Manage riparian areas for short and long-term biodiversity and productivity.
- Maintain or restore stream banks and stream channel processes.
- Maintain or restore natural and beneficial quantities of Large Woody Debris (LWD) over the short and long-term.
- Maintain or restore water quality to provide for fish production
- Maintain or restore optimum water temperatures for salmonids.
- Maintain fish passage through stream crossing structures.
- Evaluate the effect of management of adjacent areas on riparian habitats

Threatened, Endangered and Sensitive Wildlife and Plants

Ensure that Forest Service approved activities are conducted in a manner consistent with the Endangered Species Act as amended, and Forest Service regulations for Region 10 Sensitive wildlife and plant species.

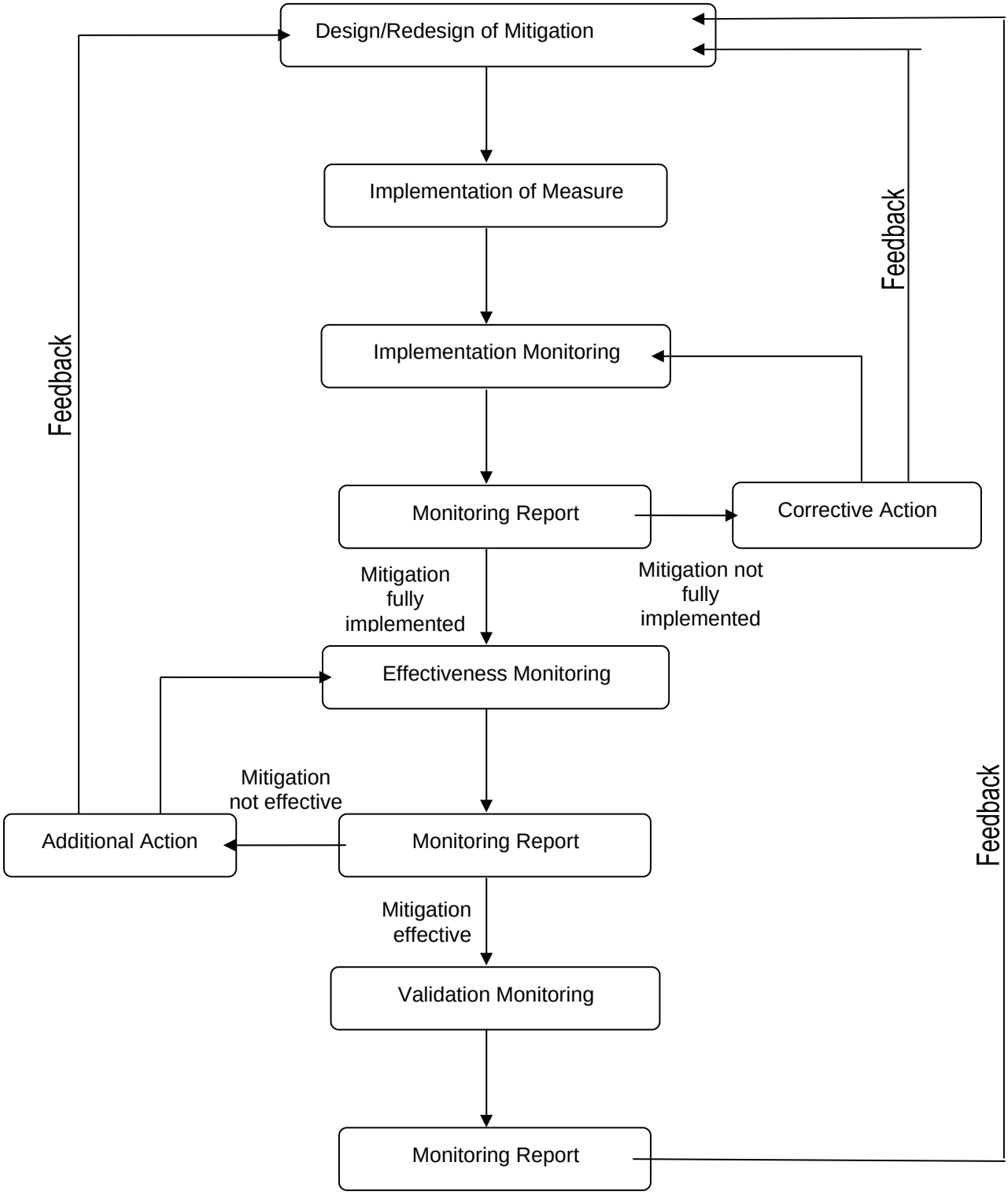

Figure D-1. Monitoring and evaluation feedback loop

Monitoring

Monitoring activities can be divided into Forest Plan monitoring and project-specific monitoring. The National Forest Management Act (NFMA) requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 6 of the Forest Plan includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation. The Forest Plan Monitoring and Evaluation Guidebook (USDA Forest Service 2000b) contains protocols to be used in Forest Plan monitoring. There are three categories of Forest Plan monitoring:

- Implementation monitoring. Used to determine whether the goals, objectives, standards and guidelines, and practices of the Forest Plan are implemented in accordance with the Forest Plan.
- Effectiveness monitoring. Used to determine whether the Forest Plan standards and guidelines and practices, as designed and implemented, are effective in accomplishing the desired result.
- Validation monitoring. Used to determine whether the data, assumptions, and estimated effects used in developing the Forest Plan are correct.

Effectiveness and validation monitoring are not typically done as part of project implementation. Implementation monitoring and any additional project-specific monitoring are, however, important aspects of this analysis. Figure D-1 displays the flow of information between implementation, effectiveness, and validation monitoring and evaluation.

Routine Implementation Monitoring

Routine implementation monitoring assesses whether the project was implemented as designed and whether it complies with the Forest Plan. Planning for routine implementation monitoring began with the preliminary design of harvest units and roads (see previous discussion under "Mitigation"). The unit and road cards (Appendices B and C, respectively), and unit silvicultural prescriptions, will be the basis for determining whether recommendations were implemented for various aspects of the project.

Staff who prepare timber sale contracts are required by Forest Service Washington Office direction (March 2000) to confirm and certify that the timber sale contract is in agreement with the decision document. This certification verifies that items such as maps, number of acres, location of units, harvest methods, and stand numbers agree. The certification also ensures that all mitigation measures identified in the EIS relating to timber sale contract requirements are included in the timber sale contract.

Routine implementation monitoring is part of the administration of a timber sale contract. The sale administrators and road inspectors ensure that the prescriptions recorded on the unit and road cards and the unit silvicultural prescriptions are incorporated into contract documents; they then monitor performance relative to contract requirements. Input by resource staff specialists, such as fisheries biologists, soil scientists, hydrologists, and engineers, is regularly requested during this implementation monitoring process. These specialists provide technical advice when questions arise during project implementation.

Implementation monitoring is conducted annually in the field by an interagency team. The team publishes their findings in an annual monitoring and evaluation report for the fiscal year.

Tongass National Forest staff annually review BMP implementation and effectiveness. The results of this review and other monitoring are summarized in a Tongass National Forest Annual Monitoring and Evaluation Report. This report provides information about how well the management direction of the Forest Plan is being carried out and measures the accomplishment of anticipated outputs, activities, and effects.

Heritage Resource Monitoring

The 2002 Programmatic Agreement (PA) between the Forest Service and the Alaska SHPO and the ACHP requires monitoring as a component of the inventory strategy. For the high-sensitivity zone, “monitor a sample of all direct impact areas during and/or after the actual ground disturbance. Impact areas to be monitored will be determined on a case-by-case basis.” For the low-sensitivity zone, “post-disturbance monitoring of a sample of all areas of actual ground disturbance. The locations and acreage sampled will be determined on a case-by-case basis.”

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Table D-1. Mitigation and monitoring measures

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
Soils							
All proposed timber harvest units	Limit mass movement from proposed harvest units	Soil 1: Identification and Avoidance of Unstable Areas-do not harvest on slopes greater than 72% or build roads on slopes greater than 67%	Conducting harvest or building roads away from known high hazard mass movement areas will reduce the risk for mass movement in the future; (Forest Plan - FEIS; Forest Plan Monitoring Report)	Hydrologist/soil scientist/layout/sale administrator	Pre harvest as well as during implementation	If encountered, document areas within individual harvest units where indications of past soil movement has occurred	
	Limit disturbance from log landing locations-to ensure protection of soil quality, wetlands, stream channels, riparian areas, and slope stability	Soil 2: Log landing location and design	Limiting disturbance from placement of log landings will reduce the risk of sedimentation to streams, impacts to wetlands, soil compaction, and ensure slope stability is not impacted; (Forest Plan - FEIS; Forest Plan Monitoring Report)	Layout/sale administrator	Pre harvest as well as during implementation	Document location of log landings and GPS their sizes	
	Limit soil disturbance to under 15% of an activity area	Soil 3: Limit soil disturbance within each activity area to under 15% cumulative detrimental disturbance	limiting soil disturbance within individual harvest units reduces compaction and displacement and ensure productivity into the future; (Forest Plan - FFEIS; Forest Plan Monitoring Report)	Sale administrator/soil scientist	During implementation	Monitor an activity area for detrimental soil disturbance post harvest activity	
Soils/Water Quality							
All proposed timber harvest units	Limit erosion and sedimentation from disturbed areas caused by the proposed action	Soil 4: Revegetation and/or protection of Disturbed Areas-measures to minimize surface erosion	Covering disturbed areas with slash or reseeding disturbed areas limits the impacts from rain splash erosion-such areas needing attention within the Tuxekan Project area include: log landing areas and road and cut fill slopes (if applicable); (Forest Plan - FFEIS; Forest Plan Monitoring Report)	Layout/sale administrator	After implementation	During road condition survey monitoring; review disturbed areas within the Tuxekan Project Areas to see if mitigation measures were affective	
Water Quality							
Within the cumulative effects watershed area	Reduce the potential for oil and/or gas to enter project area rivers and streams	Water 1: develop an oil pollution and prevention and servicing/refueling plan	Refueling vehicles in areas away from watercourses will provide water quality protection by providing a buffer should a spill occur; (Forest Plan - FFEIS; Forest Plan Monitoring Report)	Engineers/sale administrator	Pre harvest as well as during implementation	Document any spills that occur during implementation	
All proposed timber harvest units	Temporary sedimentation of streams from road building activity	Water 2: use silt fencing to reduce sedimentation from road building activity	If installed properly, silt fencing filters sediment before it can enter rivers and streams, ensuring protection from temporary water quality effects; (Forest Plan - FFEIS; Forest Plan Monitoring Report)	Engineers/sale administrator	Pre harvest as well as during implementation	Document to show that silt fencing was installed properly and where	

Appendix D – Mitigation and Monitoring

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
Wetlands							
All proposed timber harvest units	Limit impacts to all wetlands.	Wetland-1: avoid impacts to all wetlands as much as possible.	Avoidance of wetlands ensures protection from compaction, protection from changes in hydrology, and impacts to wetland vegetation, this will protect the function of wetlands in the project area into the future; (Forest Plan - FFEIS; Forest Plan Monitoring Report)	Layout/sale administrator	Pre harvest as well as during implementation	Sale administrator to document when and where wetlands are impacted	
Hydrology / Fish							
Unit 587.2-419, 587.2-424, 556-409, 557-403, 560-409	Impedance of water flow, collection of debris, sediment inputs, potential barrier to fish	Maintain fish passage at Class I and II stream road crossings using properly designed stream crossing structures (consult the Aquatic Habitat Management Handbook, FSH 2609.24). (FISH 112-IV). Modify the location of road-stream crossings to correspond with stable stream reaches. Install bridges at designated stream crossings to minimize the amount of sediment entering streams and/or to ensure good fish passage (TRAN 214-II). Implement timing restrictions for instream construction activities for the protection of anadromous and resident fish. (RIP 2-II, BMPs 14.6, 14.10, 14.14, 14.17).	Properly sized stream crossings will provide fish population and stream channel connectivity and decrease sediment inputs.	Engineering	During and Post Implementation	Forest Plan Monitoring	
Unit 556-409, 557-403, 560-428, 587.2-414, 587.2-419	Channel protection in Class IV streams	Prevention of slash in streams	Yarding away from streams will reduce the amount of slash accumulation in Class IV streams (Forest Plan - FEIS; Forest Plan Monitoring Report).	Sale Administrator	During Implementation		
All Harvest Units	Sediment transport to streams and lakes, and channel protection	Riparian Buffers: Establish no-harvest and selective cut buffers along streams and around lakes to protect riparian areas as defined by the Riparian Standards and Guidelines. Protect buffers from adjacent harvest activities (e.g., directional felling, split yarding, suspension requirements). (RIP2, BMP 12.6)	Annual Forest Plan monitoring is establishing long-term trends in effectiveness of stream buffers to protect sensitive channels and reduce sediment transport to streams (Forest Plan - FEIS; Forest Plan Monitoring Report)	Layout Crew	During layout	Forest Plan Monitoring	
Unit 557-403	Class IV flowing into lakes Protection	Directionally fall and yard trees away from the stream or fully suspend trees over the stream. No bridging of the channel with trees. Leave non-commercial trees along the stream whenever possible.	Annual Forest Plan monitoring is establishing long-term trends in effectiveness of lake and stream buffers to protect sensitive channels and reduce sediment transport to lakes. Extra protection for class IV streams that flow directly into lakes would also reduce sediment transport (Forest Plan - FEIS; Forest Plan Monitoring Report)	Layout Crew	During layout	Forest Plan Monitoring	

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
Karst							
All units	Prevent or minimize sediment introduction into karst systems	Design units to eliminate high vulnerability karst and minimize the miles of road on high vulnerability karst (SGVA 2, 3, 8); Reduce erosion and sediment transport from quarries, roads and cutslopes (BMPs 14.9, 14.18, 14.20); Properly develop and close quarries to minimize sediment sources (BMP 14.18); Maintain buffers around all direct drainages into significant karst features. Buffers will act as sediment filters (SGVA5); Yarding will not drag across and or through significant karst features and any trees felled across significant karst features shall be left in place (SGV6).	By eliminating high vulnerability karst areas from harvest the potential for sediment introduction, due to disturbance during harvest is eliminated; Proper road and quarry design reduces the size and number of potential sediment sources; By prescribing specific yarding techniques disturbance is minimized or prevented limiting the introduction of additional sediment (Forest Plan, FSH 2509.22, 2003 Forest Plan Monitoring Report).	Sale Administrator	During all phases of project implementation		
All units	Prevent impedance or diversion of surface and groundwater drainage into karst systems	Roads must avoid all significant karst features and loosing streams to the maximum extent possible (SGVA2, 3, 4, BMP 14.17); Roads must be located such that flow is in no way diverted or impeded into the karst features (SGVA4)	By avoiding the areas of atmospheric connection in the karst system, and drainages flowing into those systems, the potential for additional flow volume, into the karst system is prevented or minimized (Forest Plan, FSH 2509.22, 2003 Forest Plan Monitoring Report).	Engineering	During all phases of project implementation		
All units	Prevent the introduction of organic matter into the karst system.	Karst features will not be used for slash disposal, eliminating the introduction of excessive organics and woody debris into the underground karst system (SVGA7); Any small woody debris due to logging, which finds its way into a significant karst feature, will be removed by hand within 48 hours (SGVA6).	By preventing the introduction of levels of organic material above historical levels, alterations of oxygen consumption historical to the underground portions of the karst system are prevented (Forest Plan, FSH 2509.22, 2003 Forest Plan Monitoring Report).	Sale Administrator	During all phases of project implementation		
557-402	Prevent the alteration of groundwater flows in caves or dames of fragile formations in karst or destabilize cave passages by blasting.	No quarry will be developed atop karst without Forest Service Geologist Consultation and adequate design and survey (SGVA3, 8, 9 and BMP 14.18).	By locating pits and quarries where rock integrity is the best, this will prevent or reduce seismic related impacts associated with blasting (Forest Plan, FSH 2509.22, 2003 Forest Plan Monitoring Report).	Sale Administrator and Forest Geologist	During all phases of project implementation		

Appendix D – Mitigation and Monitoring

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
560-407	Prevent the introduction of sediment and the alteration of ground and surface flow into a collapse feature where the road can not be re-routed.	A log stringer bridge will be installed to cross the karst feature on the proposed temporary road. Geotextile fabric should be used on the bridge to keep aggregate overlay from falling into the collapse feature.	Proper design and installation will minimize adverse impacts related to karst by directing surface runoff away from the karst feature, which would include any entrained sediment (Forest Plan, FSH 2509.22, 2003 Forest Plan Monitoring Report; R10C5.206).	Engineering and Sale Administrator	During all phases of project implementation through project close-out		
556-412, 557-402, 560-401, 560-408, 560-416, 560-417, 587.2-412, 587.2-413 587.2-419	Having road on high vulnerability karst and minimizing road mileage on moderate vulnerability karst.	Relocated the proposed classified and temporary roads associated with the listed units to prevent or minimize the potential effects of roads to moderate and high vulnerability karst.	Proper road and quarry design reduces the size and number of potential sediment sources. It also minimizes the potential for impeding surface and groundwater flow on karst areas which have well developed connections to the underground portions of karst systems (Forest Plan, FSH 2509.22, 2003 Forest Plan Monitoring Report).	Engineering	During layout		

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
Threatened, Endangered and Sensitive Wildlife - Deer, Wolf, Marten							
All Units	Mortality due to trapping and hunting.	Decommission Temp Road (Forest Plan 4-102, 114, 116)	Forest Plan FFEIS Appendix N	Engineering	Post Implementation	Forest Plan Monitoring	
Threatened, Endangered and Sensitive Wildlife - Goshawk							
All Units	Disturbance of nest	W21 Verify presence/absence of nesting goshawk using the most current inventory protocols (Forest Plan 4-91, TPIT 1998). If nesting activity is found: Maintain an area of not less than 100 acres of productive old-growth forest (if it exists) generally centered over the nest tree or probable nest site; 2. Permit no continuous disturbance likely to result in nest abandonment within the surrounding 600 feet from March 15 to August 15 (Forest Plan 4-89, 4-90).	A goshawk nest protection Forest-wide Standard and Guideline protects an area of 100 acres of high volume old growth forest around goshawks nests. This does not represent a comprehensive conservation strategy, but rather serves to conserve identified goshawk nesting habitat sites with different characteristics of stand structure and landscape position. Nest site protection is only one important part of a broader landscape strategy. The Goshawk Assessment also revealed that goshawk nest sites were a nonrandom subset of the landscape with a higher proportion of productive old growth surrounding the nest. A nesting habitat protection Forest-wide Standard and Guideline serves to protect these local stand level features important to goshawks (Forest Plan FFEIS Appendix N-41).	Layout Crew; District Wildlife Biologist	During Layout and Implementation	Forest Plan Monitoring	
556-409, 557-402, 557-403, 557-404, 557-405, 557-426, 557-427, 560-407, 587.2-425	Disturbance during nesting; avoid blasting within 1/2 mile of occupied nests	W21 Verify presence/absence of nesting goshawk using the most current inventory protocols (Forest Plan 4-91, TPIT 1998). If nesting activity is found: Maintain an area of not less than 100 acres of productive old-growth forest (if it exists) generally centered over the nest tree or probable nest site; 2. Permit no continuous disturbance likely to result in nest abandonment within the surrounding 600 feet from March 15 to August 15 (Forest Plan 4-89, 4-90).	Follows direction in MOU with FWS, no information on effectiveness of mitigation.	District Biologist in coordination with FWS	pre-implementation	implementation of buffer if nests are found and determined to be needed	

Appendix D – Mitigation and Monitoring

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
All CCR units	Monitoring of goshawk and marten standards and guidelines.	Implementation monitoring - Verify goshawk and marten standards and guidelines were followed in all CCR units.	N/A	Silviculturist and Wildlife Biologist	a) Sale preparation and contract preparation. b) Immediately post harvest. c) One year after harvest.	Monitor standards and guidelines for marten and goshawk. Specifically, in CCR units where 1:1 acre ratio is used, and 10% structure must remain in the harvested portions. Monitor during sale preparation to be sure that required retained structure is protected through unit design and layout, or through specific timber sale contract provisions, or both. Post harvest, monitor for compliance, and for unexpected results. Monitor also for blowdown of retained structure.	
Threatened, Endangered and Sensitive Wildlife - Raptors							
All Units	Disturbance of nest	Verify presence/absence of nesting raptors using the most current inventory protocols (Forest Plan 4-116, TPIT 1998). Active nests will be protected with a forested 600-foot windfirm buffer, where available. Road construction through the buffer is discouraged. Prevent disturbance during the active nesting season (generally March 1 to July 31) (Forest Plan 4-114).	Forest Plan FFEIS; McCarthy, C., W.D. Carrier, and W.F. Laudenslayer. 1986. “Coordinating timber management activities with raptor nesting habitat requirements.” In: Western Raptor Management Symposium and Workshop. p. 229-232. Ref. 17676.	Layout Crew; District Wildlife Biologist	During Layout and Implementation	Forest Plan Monitoring	

Location	What situation are we trying to mitigate or monitor?	What mitigation measure (type) or type of monitoring are we proposing?	How do we know the mitigation measure will be effective? Note: this column may not be applicable to monitoring.	Person Responsible	When To Accomplish	Monitoring Plan	Date Accomplished and signature of responsible person
Threatened, Endangered and Sensitive Wildlife - Bald Eagle							
Existing rock pits within 1/2 mile of shoreline that will be used and where blasting is required	Disturbance during nesting; avoid blasting within 1/2 mile of occupied nests	W13 Avoidance. Based on the number of known bald eagle nests around the perimeter of the Island, the Forest will consult with FWS to evaluate if nest surveys are needed. If nesting is found along the shoreline within the buffer, Forest Plan direction for avoidance will be followed. Or implement after breeding season, after August 31.	Follows direction in MOU with FWS, no information on effectiveness of mitigation.	District Biologist in coordination with FWS	pre-implementation	implementation of buffer if nests are found and determined to be needed	
556-409, 556-451, 557-403, 557-405, 557-426, 560-401, 560-402, 560-409, 560-417, 560-426, 587.2-412 and 587.2-413	disturbance during nesting; avoid blasting for road construction within 1/2 mile of occupied nests and repeated helicopter use within 1/4 mile of nest	W13 Avoidance. Based on the number of known bald eagle nests around the perimeter of the Island, the Forest will consult with FWS to evaluate if nest surveys are needed. If nesting is found along the shoreline within the buffer, Forest Plan direction for avoidance will be followed. Or implement after breeding season, after August 31.	Follows direction in MOU with FWS, no information on effectiveness of mitigation.	District Biologist in coordination with FWS	pre-implementation	implementation of buffer if nests are found and determined to be needed	
Sensitive Plants							
All units	Impacts to sensitive plant resources in harvest units	If any sensitive plants are identified during the execution of this project, the district ecologist will be immediately notified to asses any potential impacts and flag and avoid the area if necessary	Assessment of new occurrence and evaluation by district ecologist to ensure no impacts	District Ecologist	implementation		

Appendix F - Roads Analysis Working Paper
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Introduction

Planning for the Tuxekan Timber Sale Environmental Impact Statement (EIS) began in January 1999. Timber sale pipeline funds were available to contract the reconnaissance and writing of the EIS. In August 1999, a two-phase contract was awarded to Dames and Moore, Inc. (which subsequently merged with URS Corporation) to conduct field inventories and resource reports (Phase I), and the Draft EIS (DEIS (Phase II)). TEAMS Planning, a Forest Service enterprise group has been contracted to prepare the Final EIS (FEIS) for the Tuxekan Project.

While the Tuxekan EIS contract was being written, the National Roads Analysis process was being developed. *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System* was published in August 1999 (USDA FS 1999a).

"Roads analysis" as described in FS-643 is primarily a stand-alone procedure (USDA FS 1999a). However, the conceptual framework and resources for analysis may be integrated into any analytical process in which roads are examined. Also, when ecosystem analyses or assessments have been completed, the roads analysis will use that information rather than duplicating these efforts.

The Tuxekan Island Roads Report (URS 2002d) contains most of the elements of the roads analysis. The other components of a roads analysis are discussed in other resource reports (e.g., the watershed analysis [URS 2002c]), products of the EIS scoping process (e.g., the scoping report [URS 2001a]), and interdisciplinary team (IDT) notes. An Access and Travel Management plan (ATM) is currently being conducted for Prince of Wales Island that will include the Tuxekan Island project area.

The Tuxekan Access Management has been modified to include all of the road management recommendations made in the POW ATM on existing NFS roads. The POW ATM made recommendations only for existing National Forest System (NFS) roads. Therefore, all new roads proposed, existing NFS roads, and 1.5 miles of unauthorized road within the project area will follow the travel management recommendations identified by the Tuxekan Access Management Plan Since all existing NFS roads identified in the Tuxekan Access Management Plan follow the recommendations in the POW ATM, additional analysis will not be required. The purpose of this working paper is to document what has been done, where the information is located in the project file, and how the pieces fit into what is required by the roads analysis process. The working paper is not a stand-alone document. It references work already completed by the EIS contractor and the Forest Service. Where existing information does not cover elements of the roads analysis process, the working paper provides the missing information.

Roads Analysis Overview

In 2001, the Forest Service issued the "Roads Rule" which gives management policy regarding existing roads, new road development, and roadless areas within the National Forests. A component of this policy is the use of an analysis process that efficiently and accurately describes the biological, physical, social, and economic information essential for making sound road management decisions.

The primary objective of the roads analysis is to provide information to develop a road system that is safe and that addresses the needs and desires of the public. The road system should be affordable and efficiently managed and have minimal negative ecological effects on the land. Furthermore, it must be in balance with available funding for needed management actions.

Tuxekan Project Area

The 17,730-acre Tuxekan project area is described in Chapter 1 of the EIS. The project area includes state land on the northwest and east sides of Jinhi Bay (836acres) and Sealaska Regional Corporation land at Karheen Cove (5 acres).

There are no Roadless Areas located on Tuxekan Island. The Forest Plan Revision, Supplemental EIS, Roadless Area Evaluation for Wilderness Recommendations (SEIS) increased the number of small (less than 1,000-acre) unroaded areas on Tuxekan Island. There are also areas classified as unroaded areas surrounded by developed areas. The largest of these areas is 712 acres, and the smallest is less than one acre. Together, these small unroaded areas total 3,341 acres. Locations of the small unroaded areas may be found in Figure 3 5 Small Unroaded Areas of the FEIS. These unroaded areas were not classified as single inventoried roadless area, and are not specifically described in the SEIS. These areas are fragmented by past timber harvesting activities. The landscapes of these areas appear natural in the midst of an area designated as a timber LUD These unroaded areas offer a sense of remoteness that provides an opportunity for solitude on Tuxekan Island.

A brief history of past logging and road construction activities is included in the Roads Report (URS 2002d), which is in the planning record. Approximately 7,197acres of second-growth timber are on National Forest System lands in the project area.

The Roads Report discusses the total miles of existing NFS and miles of unauthorized road (58.8, 41.0, and 17.8 miles, respectively) on National Forest System lands. Of these existing Forest roads, 36.6 miles (62 percent) are open to either high-clearance vehicles or off-highway vehicles. The remaining 22.2 miles are mainly impassable to vehicle traffic because of the removal (or deterioration) of drainage structures and/or natural regrowth (primarily alder) across the roadway. All existing unauthorized roads on NFS lands are currently impassible.

One permitted Marine Access Facility (MAF) is in the project area. The Nichin Cove MAF and its effects on the marine environment are discussed in FEIS Chapter 3, Other Resources, Essential Fish Habitat.

1997 Forest Plan Direction for Roads

Two land use designations (LUDs) are in the project area: Timber Production and Old-growth Habitat. The Roads Report summarizes the Forest Plan direction. For the entire text, see Forest Plan, pp.3-144 through 3-150 for Timber Production, and pp. 3-76 through 3-82 for Old-growth Habitat.

Generally, all NFS roads on Tuxekan Island are considered available for public use. The types of use vary from high clearance vehicles to hikers. Currently no site-specific Code of Federal Regulations (CFR) closures are in effect on the island. NFS roads are mainly used by

off-highway vehicles (OHVs/four-wheelers and motorcycles), because the local terrain and dense vegetation limit off-road use.

Road Condition Surveys

A Road Condition Survey (RCS) (USDA FS 1999b) was conducted for the NFS roads and some of the unauthorized roads on the island. The RCS database has been updated to include road maintenance work performed by the Thorne Bay Ranger District between the DEIS and the FEIS. Information gathered during the process is used to identify blockages to fish passage, the location of eroding soils, cross drain problems, and ditches that are not providing proper drainage. The updated RCS and associated geographic information system (GIS) coverages are in the planning record.

Key Issues

Public scoping was carried out early in the process to determine the scope of the issues to be addressed and to identify the significant issues related to the proposed action. Road management was addressed in the scoping documents sent to the public for comment. The results of scoping are included in the *Scoping Report for Kosciusko Island Timber Sale EIS and Tuxekan Island Timber Sale EIS* (URS 2001a) in the planning record and in Chapter 1 of the FEIS. Road management was not identified as a significant issue after evaluating the public responses received during Scoping for the Tuxekan Project.

Interdisciplinary Team Process

The interdisciplinary team approach was used for all phases of the Tuxekan Timber Sale FEIS. Chapter 4 of the FEIS lists team members, reviewers, and others who contributed to this FEIS.

Ecosystem Functions and Processes

The Forest Plan Revision, Supplemental EIS, Roadless Area Evaluation for Wilderness Recommendations (referred to in the following pages as SEIS) increased the number of small (less than 1,000-acre) unroaded areas on Tuxekan Island. There are also areas classified as unroaded areas surrounded by developed areas. The largest of these areas is 712 acres, and the smallest is less than one acre. Together, these small unroaded areas total 3,341 acres. Locations of the small unroaded areas may be found in Figure 3-5 Small Unroaded Areas. These unroaded areas were not classified as single inventoried roadless area, and are not specifically described in the SEIS. These areas are fragmented by past timber harvesting activities. The landscapes of these areas appear natural in the midst of an area designated as a Timber LUD. These unroaded areas offer a sense of remoteness that provides an opportunity for solitude on Tuxekan Island.

No noxious weed surveys have been completed within the project area. However, non-native-invasive plants and noxious weeds are generally spread from human habituation centers, outward along roads, via road maintenance machinery, or through the movement of fill material. Since Tuxekan Island is not connected to any other road systems, the potential for increased spread of non-native invasive and noxious weeds into the project area is relatively

low. Because of the relatively low potential for spread of non-native invasive species and noxious weeds it is expected that the impact on ecosystem function in the area will be minor. Roads provide a cost-effective means of accessing stands to control insects and disease or to regenerate decadent stands. Though control is rarely an objective, diseased and stressed trees are removed during timber harvest and replaced by young vigorous trees.

The major disturbance regime in southeast Alaska is wind. Major storms occur over large areas every 100 to 200 years. Minor storms occur every decade or so. These storms usually come from the southeast during the winter months. Trees on southeast aspects are most susceptible to wind damage. Outer island wind ecology was evaluated and windthrow risk is documented in the planning record. Roads open stands and increase the susceptibility of adjacent trees to windthrow. Damage is variable depending on many factors.

Because of the remoteness of the island and the absence of permanent residents, the risk of fire and the effects of noise caused by developing, using, and maintaining roads are minimal.

Public Safety Risks

The roads on Tuxekan Island were primarily constructed to haul timber. Access for recreation and subsistence use in vehicles is a by-product of the existence of the roads. The roads were built and are maintained for high clearance vehicles. If standard passenger vehicles are brought to the island, this type of vehicle may use the roads but there is a greater risk of damage from rocks and potholes.

OHVs are increasing in popularity. These vehicles are either boated or barged to the island by non-residents. Dangers to the public include isolation from medical facilities if inexperienced riders or speeders are injured.

During road construction and harvest activities, traffic levels will increase. The risk of encounters between industrial and non-industrial users may increase. However, during harvesting, access to help will be somewhat improved as almost all of the industrial vehicles have radios that could summon help from off the island if an accident occurs. When harvest is complete, traffic levels should return to their relatively sporadic and low pre-harvest levels.

Aquatic, Riparian Management Areas (RMAs), and Water Quality

Roads can have adverse impacts on watersheds, especially if the roads are not properly maintained. Poorly maintained roads can promote erosion and landslides, degrading riparian habitat and water quality through sedimentation and changes in stream flow. When roads are properly constructed and maintained, adverse impacts can be minimized.

Field reconnaissance was conducted and resource reports describing current conditions are included in the planning record. Chapter 3 of the Tuxekan FEIS discusses the environmental effects of alternatives. During field reconnaissance, random water samples were collected and analyzed. The results are provided in the Geology Report (URS 2002a) in the planning record. Any changes in water quality could be compared to these samples.

Implementation of the comprehensive access management plan would address long-term problems associated with existing roads.

Watersheds

A watershed analysis was conducted for the project area. All watersheds were evaluated in terms of the amount of existing road and road density. The watershed analysis summarized information from the RCS (USDA FS 1999b) about the condition of roads and highlighted areas needing attention. The results of the Tuxekan Watershed Analysis (URS 2002b) are in the planning record.

Terrestrial Wildlife

Tuxekan Island has no land-based communities. Several float houses, that are temporary in nature, are in Jinhi Bay and Nichin Cove. The float house owners may be utilizing the road system for hunting and trapping. Non-island residents occasionally bring high clearance vehicles, four wheelers, and/or motorcycles to the island by boat or barge to use the roads for sport and subsistence hunting, fishing, and trapping. Deer populations are reported to be low (ADFG 2000), but black bear are numerous (ADFG 2001). Some outfitter/guides bring clients to the island for black bear hunting. The Wildlife Resources Report (USFS 2005b), which is in the planning record, discusses wildlife species and populations on the island.

Economics

Forest roads in Southeast Alaska are the most expensive to build in the nation. Costs range from $120,000 to $180,000 per mile for NFS roads and from $80,000 to $120,000 for temporary roads (NEPA Economic Analysis Tool (NEAT) 2004). The major factor influencing the high local cost is rock, which must be produced by drilling and blasting bedrock, then hauling and shaping it into a roadbed over typically soft, uneven terrain. Other factors include the isolation of the project area, which increases the costs of shipping, labor, and logistics. Drainage structures are typically more numerous per mile than elsewhere in the United States.

A financial efficiency analysis was prepared as part of the Economic Analysis Report (URS 2002f) is in the planning record. In order to incorporate the most up to date economic data, the Economic Analysis for the project was reanalyzed using the Region 10 National Environmental Policy Act (NEPA) Economic Analysis Tool (NEAT) dated May 2004.

Timber Management

The existing Forest roads on Tuxekan Island were constructed to support timber harvest. The location, spacing, and design of these roads were determined by the location of proposed log transfer sites, harvest units, and by the yarding systems proposed for timber removal. Though the main collector roads are now in place, shorter local and temporary roads are needed to reach timber stands in some areas.

The amount of helicopter logging has increased in Southeast Alaska in recent years. Existing roads and reconstructed older roads are often used as landings. Since helicopter yarding is expensive, road access reduces yarding distances and costs.

The road system on Tuxekan Island provides access to young managed and mature stands in the suitable timber base. These roads reduce logging costs and provide a connection to

logging camps and the log transfer site. Resource managers, such as wildlife and fishery biologists, use road access when conducting population surveys or inventories for enhancement projects. Engineers use the roads when assessing maintenance and potential reconstruction projects.

Most of the managed stands on Tuxekan Island are along or near roads, which provide access to the stands when silvicultural treatments are needed. Roads reduce costs associated with regeneration surveys, tree planting, pre-commercial thinning, and commercial thinning by providing direct drivable access to these stands or adjacent areas. Closing roads would increase access costs for activities such as managed stand improvements and fisheries and wildlife enhancement projects.

Minerals

There is one mining claim on National Forest System land near the south end of the island. A unique type of pink marble with special commercial value is intermittently mined for use as raw material for sculptors and other artisans.

Water Production

No permanent domestic water sources are on Tuxekan Island. During timber sale activities domestic water lines are established for camps and/or barges. The camps and barges provide their own filtration and treatment systems.

Special Use Permits

There are no special use permits specifically issued for Tuxekan Island. Several outfitter/guides have permits to guide bear hunters in the outer islands area and occasionally bring four wheelers to use on the road system. Boat-based outfitter/guides use the shoreline and marine waters around the island for fishing, hunting, sightseeing, and photography.

General Public Transportation

Presently, the public has access by boat to the entire shoreline plus the off-loading site for vehicles at Nichin Cove. Because of the difficulties in bringing vehicles to the island the use of the interior of the island is low. There are no plans to link Tuxekan Island to any other island road system by ferry, bridge, or tunnel.

Administrative Use

Various federal and state agencies use the existing road system for research, inventories, and field monitoring for projects involving fish, wildlife, and forestry. The existing road system allows access to most watersheds in the project area. Some additional local or temporary roads may be needed in the future to access timber stands in the Timber Production LUD. The existing transportation structure aids in reducing costs and time associated with field observations.

Law enforcement activities on the island are relatively infrequent. When they occur, the road system is an efficient means of travel to the interior of the island.

Forest Protection (Fire)

The island is located in a temperate rain forest; therefore, fire hazards are usually very low. If a fire was to occur, suppression activities would by aided by the presence of existing roads.

Recreation

Tuxekan Island is heavily roaded. Roaded modified recreation opportunities are available over most of the island. Some Semi-primitive Motorized opportunities occur along the coast. Semi-primitive Non-motorized recreation is limited to the vicinity of Karheen Lakes.

The most common recreation activities on the island are stream fishing, hunting, surveying and exploring caves, beachcombing, kayaking, and beach camping. Some of the water-based recreationists may hear noise from roads if they travel around the island during the times that vehicles are on the island.

In general, residents of nearby communities have stated that they would like more roads to be kept open for roaded recreation and subsistence activities. All vehicles must be brought in by barge or boat. Most visitors coming to Tuxekan bring off-highway vehicles from Prince of Wales Island or from fishing vessels traveling through the outer islands.

Developing new roads into unroaded areas, decommissioning some of the existing roads, or changing maintenance of existing roads would be apparent to the people who use the existing road system but would cause no substantial changes to the quantity, quality, or type of roaded recreation opportunities. However, changing the maintenance level of a substantial amount of road from open to closed could affect the amount of roaded recreation and subsistence use by people visiting the island. Hunters, fishers, and trappers have other areas available to them in Southeast Alaska. However, Tuxekan Island provides a unique experience with roads available for vehicular travel and very few other people using the road system.

The Recreation Resource Report (URS 2002e), which is in the planning record, discusses the Recreation Opportunity Spectrum and recreation uses in the Tuxekan project area.

Passive-use Value

Passive-use values include the values people place on an area or resource that are not associated with actually using, visiting, extracting, or even viewing the resource they value. Passive-use value is the value of knowing a resource exists, even if a person never intends to visit or use it. Passive-use values are difficult to quantify, and it is debatable whether they should be quantified.

Threatened & Endangered Species

The only threatened and endangered species in the general area of Tuxekan Island are the Steller sea lion and humpback whale. Both are marine mammals and would not be affected by road construction or closure.

Social Issues

Visitors to the island rely on the existing road system for access to inland recreation activities such as hunting and fishing and also for access to subsistence resources such as deer. Several communities rely on Tuxekan Island (WAA1531) for subsistence deer hunting, with 33 percent of all Edna Bay households reporting use between 1995 and 1999. Tuxekan Island was used for subsistence deer hunting by 20 percent of Naukati households, 16 percent of Coffman Cove households, and 13 percent of Whale Pass households (Turek 2001). However, deer harvest survey data collected from 1996 through 2003 by the Alaska Department of Fish and Game indicates that most of these communities actually obtained less than 1 percent of the total community deer harvest from WAA 1531. The only exception was Naukati Bay which averaged an estimated 3.3 percent. A large percentage of the roads have been around since timber harvests in the 1960s. Visitors to the island have become accustomed to the use of these roads.

The existing Tuxekan road system could be used for visiting known archaeological sites. However, most of the sites are along the coastline, which is relatively free of roads. There are no known paleontological or historical sites that would be adversely affected by the road system.

The road system may allow easier access to cultural and traditional use areas if one is able to get a vehicle to the island. These use areas are generally coastal and are accessible by boat. The road system does not affect Native American treaty rights.

There are no roads in the project area that constitute historic sites.

Road management may affect the social and economic health of residents of nearby communities and outfitter guides (primarily for bear). These people use the road system to access hunting areas and fishing streams, and for general recreation activities. Even though the island has a fairly extensive Forest road system, ample opportunities remain for solitude on the road system, along the coastline, and on the ocean around the island.

Traditional activities related to plant and animal species in the project area include collecting bark from western red cedar and Alaska yellow cedar, berry gathering, gathering wood for fuel, seaweed gathering, deer and bear hunting, salmon fishing, and shellfish harvesting.

Civil Rights and Environmental Justice

The road system and its management does not adversely affect most groups of people, although low-income groups may not have the means to access the island road system due to its remoteness.

Roadless Areas

There are no Roadless Areas located on Tuxekan Island. The TLMP Revision, Supplemental EIS, Roadless Area Evaluation for Wilderness Recommendations increased the number of small (less than 1,000-acre) unroaded areas on Tuxekan Island. Three of the small unroaded areas mapped in the SEIS occur near the proposed harvest units. Together, the areas total 1,467 acres, or roughly 8 percent of the National Forest system lands on the island. The three small unroaded areas are located on the north, west, and east coasts of Tuxekan Island. No

adverse effects from any action alternative are anticipated for any of the small unroaded areas.

Road Maintenance Funding Levels

Funds available for road maintenance in the Thorne Bay Ranger District depend on the annual appropriations process in the U.S. Congress. Historically, the annual funding level has not been adequate to perform all of the needed maintenance work on the Thorne Bay Ranger District's approximately 1,950 miles of NFS roads. Maintenance that was not performed due to inadequate funding was delayed for a future period. In order to complete all of the deferred maintenance work on the 1,400 miles of open NFS roads in the district, an estimated $25,200,000 of funds would be necessary. Approximately $2,475,000 of additional funds are needed to stabilize the remaining closed unauthorized roads in the district. For Tuxekan Island, approximately $760,000 is needed for NFS roads, and $85,500 is needed for unauthorized roads. This includes removing drainage structures, adding waterbars, and stabilizing loose soils with grasses or armor rock. The deferred maintenance work can be completed and funded on some roads within timber sale areas if the roads are necessary for timber haul. Completing deferred maintenance on roads not associated with timber sales is dependent on the receipt of direct appropriations for specific projects.

As a result of the 2001 Roads Rule, the definitions of road reconstruction and maintenance have changed. The original road work proposals and analysis for Tuxekan were completed about the same time (2001) as the Roads Rule. Since it typically takes at least a year or more to fully interpret and implement new regulations across the agency, the Thorne Bay Ranger District did not choose to change the roadwork proposal as a part of the DEIS issued in December 2004. Since that time, the national forests have received clearer guidance and have chosen to implement these changes. Specifically, the roadwork package that was proposed under the DEIS included approximately 31 miles of road reconstruction. Because of interpretation of the roads rule, approximately 29 miles are now considered road maintenance. Approximately 23 miles of these 29 miles of road maintenance have been implemented and is considered as part of the existing condition for the project area. An estimated 6 miles of road that are planned for use will receive pre-haul maintenance or reconditioning prior to timber sale operations.

Recent estimates of annual maintenance funding needed for all of the forest roads in the district were approximately $1,500,000. The needs for Tuxekan range from $15,000 to $60,000 annually, depending on the amount and location of timber haul. Timber purchasers perform a portion of the annual maintenance work during timber sale activity, with the remainder of the work performed by businesses under contract with the Forest Service for specific road-related work.

Road Density

The 1997 Forest Plan recommends open road densities of 0.7 to 1.0 mile per square mile or less where wolf mortality concerns have been identified through analysis (USDA FS 1997). Presently, there are no official concerns about wolf populations on Tuxekan Island. However, road maintenance budgets have not been, and are not expected to be, enough to maintain all of the existing and planned roads on the island. While controversial, the closure of existing roads is one method of reducing open road densities while increasing the effects of the

maintenance budget. Others methods include closing newly built roads after log harvest is complete but before public use becomes established. Whatever methods are used to manage and maintain the Forest roads on the island, the roads analysis is considered a useful tool in documenting existing open and closed roads, roads commonly used by the public, roads receiving little use, and roads that should be upgraded and maintained in the future.

Road densities (the linear miles of road divided by the square miles of area within the project area) can be used as a measure of potential impact. Currently total road density (disregarding drivable and non-drivable road characteristics) on National Forest System land on Tuxekan Island is 2.2 mile per square mile. The density of roads that can currently be driven by high-clearance vehicles is 1.4 mile per square mile. Following implementation of the proposed access management plan the open road density on Forest Service System land would be 0.80 miles per square mile.

On the watershed level, watersheds with higher open road densities may be likely to have erosion and water quality degradation. However, it should be understood that road density is only an indicator, not a measure, of erosion or water quality degradation. One mile of poorly located, constructed, or maintained road may cause more negative impacts than many miles of properly located, constructed, and maintained road.

Road Status

Annual road maintenance funds are not expected to be sufficient to fully maintain all of the Forest roads on the island if they are kept open. With some roads closed and in storage, more funding can be used on the remaining open roads. Some hunters and recreationists have kept narrow traffic lanes open on several of the roads on the island. This use, coupled with limited maintenance, has created potential problems with water quality where drainage structures have become blocked, and road rutting has channeled surface water down some of these roads. In order to minimize any adverse effects on the environment while operating with a limited budget, some of the Forest roads would need to be closed to motorized traffic.

Open Roads on Tuxekan Island

Chapter 3 of the FEIS includes a table (Table 3-72 Forest Service road management objectives) that describes the four road management objectives (RMOs) (open, stormproof, store, and decommission). It also includes the proposed access management plan for Tuxekan (Table 3-73 Tuxekan proposed access management plan). The proposed access management plan was developed by the IDT for the Tuxekan Timber Sale EIS with consideration of public input and all resource concerns. The proposed plan provides detailed information about future management of each NFS road in the project area. NFS roads on the island that would be open to vehicle traffic fall into two categories, open and stormproofed. The open and stormproof roads would be maintained for high clearance and off-highway vehicles. All of the open road miles would receive periodic roadside brushing and drainage structure maintenance.

Closed Roads

Chapter 3, Table 3-73 Tuxekan proposed access management plan, lists roads or segments of NFS roads proposed for closure (store or decommission) and describes the activities that would take place to close the roads.

Temporary Roads

Temporary roads, also known as spur roads, are short-term roads that are constructed by timber purchasers during timber sales and then closed upon completion of the timber sale. All temporary roads would be decommissioned within one year after harvest to restore subsurface and surface drainage using techniques outlined in BMP 14.24. These roads would not become NFS roads.

Unauthorized Roads

Approximately 17.8 miles of unauthorized roads on NFS land are located on Tuxekan Island. Many of these roads were constructed for earlier timber sales, do not have a road number, and have closed (revegetated) naturally. Currently the proposed access management plan recommends decommissioning the isolated unauthorized road system southeast of Turn Point (1.5 miles). Though not completed at this time, road condition survey work would be performed on unauthorized roads in the same manner as that performed on NFS roads in order to identify any needed work. After a review of the results of the road condition survey, each road would either be classified and remain in the system or be decommissioned and deleted from the system. These decisions on the remaining 16.3 miles of unauthorized will be made by the Thorne Bay Ranger District in the future, after completion of the POW ATM. In either case, work necessary to resolve any resource concerns identified by the road condition survey would be performed before final settlement of the status of the road.

Road Strategy Today

The past practice regarding road management after timber harvest was to allow naturally established alder growth over the roadway. The practice was used extensively but has recently been called into question. Allowing roads to close naturally, while leaving drainage structures in place, has created the potential for erosion and subsequent water quality concerns downstream. In part due to the increased awareness in the potential effects of older roads on water quality, the natural method of road closure has been revised to include the removal of drainage structures and the addition of waterbars to aid in controlling runoff. Regardless of which alternative is selected, based on public input and the consideration of all resources by the IDT, all proposed NFS roads in the Tuxekan Project Area would be stored and all proposed temporary roads would be decommissioned.

The proposed access management plan for the Tuxekan project area (Table 3-73) is to keep open 17.7 miles, stormproof (ML 2) 4.3 miles, store 19 miles, and decommission 1.5 miles. Therefore, 22 miles of NFS road on NFS lands would be maintained and available to both high-clearance and off-highway vehicles. The remaining 16.3 miles of existing unauthorized roads on NFS lands will remain as is until a determination is made to add them to the NFS or to decommission them.

The open and stormproof roads provide vehicular access from the MAF at Nichin Cove to the north, south, east, west, and interior of the island. The store and decommission roads provide walk-in access to additional areas off the open and stormproof roads. Boats and kayaks provide walk-in access from the points on the beach that surrounds the island.

Appendix G - Other Supportive Information
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Introduction

Appendix G includes:

- General information that has been moved from the DEIS to this appendix for the FEIS
- Additional Forest Plan information
- Background Information pertinent to the Tuxekan Project

Federal and State Permits, Licenses, and Certifications

State of Alaska, Department of Environmental Conservation

- Certification of compliance with Alaska Water Quality Standards (Section 401 Certification).
- Solid Waste Disposal Permit (Section 402 of the Clean Water Act).

State of Alaska, Department of Natural Resources

- Authorization for occupancy and use of tidelands and submerged lands.

U.S. Army Corps of Engineers

- Approval of discharged dredged or fill material into waters of the United States (Section 404 of the Clean Water Act of 1977, as amended).
- Approval of construction of structures or work in navigable waters of the United States (Section 10 of the Rivers and Harbors Act of 1899).

U.S. Coast Guard

- Coast Guard Bridge Permit (in accordance with the General Bridge Act of 1946) required for all structures constructed across navigable waters (within the tidal influence zone) of the United States.

U.S. Environmental Protection Agency

- Storm water discharge permit.
- National Pollutant Discharge Elimination System review (Section 402 of the Clean Water Act).

Applicable Laws and Executive Orders

Shown below is a partial list of federal laws and executive orders pertaining to project-specific planning and environmental analysis on federal lands. While most pertain to all federal lands, some of the laws are specific to Alaska. Disclosures and findings required by these laws and orders are contained in Chapter 2 of this EIS.

- Multiple-Use Sustained-Yield Act of 1960
- National Historic Preservation Act of 1966 (as amended)
- Wild and Scenic Rivers Act of 1968, amended 1986
- National Environmental Policy Act (NEPA) of 1969 (as amended)
- Clean Air Act of 1970 (as amended)
- Costal Zone Management Act (CZMA) of 1972 (as amended)
- Alaska Native Claims Settlement Act (ANCSA) of 1971
- Marine Mammal Protection Act of 1972
- Endangered Species Act (ESA) of 1973 (as amended)
- Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974 (as amended)
- National Forest Management Act (NFMA) of 1976 (as amended)
- Clean Water Act of 1977 (as amended)
- American Indian Religious Freedom Act of 1978
- Alaska Native Interest Lands Conservation Act (ANILCA) of 1980
- Archeological Resource Protection Act of 1980
- Cave Resource Protection Act of 1988
- Tongass Timber Reform Act (TTRA) of 1990
- Magnuson-Stevens Fishery Conservation and Management Act of 1996
- Executive Order 11593 (cultural resources)
- Executive Order 11988 (floodplains)
- Executive Order 11990 (wetlands)
- Executive Order 12898 (environmental justice)
- Executive Order 12962 (aquatic systems and recreational fisheries)

Landscape Analysis

The project area (17,730 acres) is included in the larger Tuxekan planning area (121,805 acres). The Tuxekan planning area has been shown on the Tongass National Forest multi-year timber sale plans for the last several years. An interdisciplinary team (IDT) conducted a landscape analysis of the Tuxekan planning area in order to synthesize the various resource conditions, objectives, and opportunities. The landscape analysis identified logical "treatment" areas (silvicultural treatment accomplished through timber harvesting). The

Tuxekan Position Statement documents the landscape analysis process and is part of the Tuxekan Timber Sale Environmental Impact Statement planning record.

Field Studies

Field studies for wildlife, fisheries, timber and engineering, silviculture, hydrology, heritage, and karst were conducted in 1999, 2000, and in 2005 to verify and update resource information contained in the Tongass National Forest geographic information system (GIS) and to collect specific information related to the issues of the timber sale. GIS resource information includes streams, important wildlife habitat, timber and soil inventories, and locations of proposed harvest units.

The vegetative cover in the project area inhibits on-the-ground location of karst features and accurate identification of areas with steep slopes. Because of the potential sensitivity of karst features to forest management activities, a laser-based technique called light detection and ranging (LIDAR) was used to obtain significantly better topographic information for the project area than was available using conventional photogrammetric methods. The topographic data supplemented field inventory techniques for location of karst features and were used to determine the presence and location of steep slopes in proposed harvest units. Groundwater flow paths in karst areas were traced using inert dyes.

Unit and road cards were used to document the locations and resource concerns for possible harvest units and roads (Appendices B and C). Resource specialists listed specific concerns on the cards and made recommendations to address or mitigate those concerns. Information from field studies and GIS was used to assess the issues, develop alternatives, and analyze the environmental effects of each alternative.

Inventories, resource specialist reports, and GIS information are part of the project planning record. The public scoping report and the unit and road design cards are also included in the planning record. The complete planning record, important supporting documents, and maps from the planning record will be maintained at the Thorne Bay Ranger District Office in Thorne Bay, Alaska.

Alternative Development Process

Original Proposed Action[1]

The Notice of Intent (NOI) and subsequent public involvement for the Tuxekan Island Timber Sale Project (referred to as the Tuxekan Project) proposed timber harvesting on approximately 2,100 acres that would produce an estimated harvest volume of 20 million board feet (mmbf).[2]

The Proposed Action (Alternative 3) was one of several possible approaches to accomplishing the goals described in the "Purpose and Need" section of Chapter 1. The maximum amount of timber was made available in this alternative.

[1] Developed by URS – original contractor on the project
[2] Information from: Tuxekan NOI, Federal Register, 3/20/2000 and Tuxekan scoping letter date, 4/1/2000

Appendix G – Other Supportive Information

A preliminary map of possible units was initially prepared for the project based on an island-wide logging systems and transportation analysis (LSTA). The LSTA consisted of about 4,250 acres in 89 units; based on lands classified as suitable and available for commercial harvest at the time. A smaller pool of 51 potential units was then selected that reflected a rough estimate of the timber the project area could potentially provide under Forest Plan parameters. This unit pool was the basis for the estimated volume of 20 MMBF proposed during the scoping process.

Based on short- and long-term landscape or resource objectives, the interdisciplinary team (IDT) assigned preliminary timber harvest prescriptions for each potential harvest unit. This unit pool and the roads needed to access the units were then evaluated in the field. The unit pool was also used for public scoping for the project and was identified at that time as the pool to be used in the Proposed Action. The Proposed Action for the DEIS (Alternative 3) changed from the one described during scoping as a result of field analysis

Potential harvest units were validated, modified, dropped, or placed into deferred or reserved areas based on IDT field investigations. Modifications were made to meet Forest Plan standards and guidelines. For example, if a stream was discovered that was not visible on aerial photographs, the riparian Forest-wide standards and guidelines were applied. Some units were adjusted or combined to have more logical boundaries or to facilitate logging systems, and some were expanded to prevent isolating timber stands from future harvest. This led to a final unit pool of 39 units on about 1,330 acres for the IDT to consider when forming the Proposed Action and the other alternatives.

Significant portions of these 39 units were deferred or reserved from harvest to contribute to marten, goshawk, and other Forest Plan Standards and Guidelines. The IDT deferred 5 of the 39 units from the action alternatives. Descriptions and resource considerations for the remaining 34 units were included on the unit cards (DEIS Appendix B). Road management objectives are described on the road cards (DEIS Appendix C).

Alternative Development

The IDT used information from public scoping, including the significant issues identified for the project, in conjunction with the field-verified pool of units and related resource information, to form different alternative “frameworks.” Based on these frameworks, the IDT then assigned potential harvest units to each framework to create the various alternatives (Alternatives 2-4). Each action alternative presented in this DEIS provided a different response to the significant issues. These action alternatives were designed to meet the stated purpose and need, Forest Plan standards and guidelines, the project-specific desired future conditions.

Each action alternative represented a site-specific proposal developed through an intensive interdisciplinary evaluation of timber harvest unit and road design, based on field verification. Unit identification and design also made use of high-resolution topographic maps and aerial photographs, LIDAR data, and a large quantity of resource data available in GIS format.

Modified Proposed Action and Alternative 5

Following publication of the Tuxekan Draft Environmental Impact Statement (DEIS; December 2004) for the Tuxekan Project, further fieldwork and analysis were completed by the IDT[3], and a Modified Proposed Action (Alternative 3) was developed. Alternative 3 continues progress toward the desired future condition for timber production while meeting Forest Plan standards and guidelines.

Alternative 5 was developed in response to comments received during the public comment period on the DEIS. This alternative was developed to balance the purpose and need developed for the project while addressing the significant issues developed from scoping responses and concerns raised following comment on the DEIS.

Forest Plan Consistency

All action alternatives are consistent with the Forest Plan. All applicable Forest-wide and Land Use Designation (LUD) standards and guidelines have been incorporated. The Forest Service uses many mitigation and preventive measures in the planning and implementation of land management activities. The application of these measures begins during the planning and design phases of a project. Additional direction comes from applicable Forest Service manuals and handbooks.

Areas Reserved From Harvest

A portion of each unit would be deferred from timber harvest (this area is predominately located in units where clearcut with reserves (CCR) is proposed, but may occur in some single tree selection (STS) units). These areas, shown on the alternative maps in yellow and cross-hatched on ROD unit card maps (Appendix 1), have several sources. Depending on the site-specific characteristics of the unit, this area may include land classified as unsuitable due to high-vulnerability karst, mass movement index (MMI) 4 soils, or Riparian Management Areas (RMAs).

These reserved areas are classified as unsuitable land and would be removed from the suitable timber base as directed by Forest Plan standards and guidelines. The deferred areas are also necessary to adhere to marten and goshawk recommendations from the Tongass Plan Implementation Team (TPIT) Clarification Papers (USDA Forest Service 1998). The TPIT clarification recommends a 1:1 factor for stand retention, stating that for every acre harvested an equal number of unharvested acres should be retained in the unit. If a specific area within a unit is located on suitable and available land, but is necessary to meet the TPIT recommendations, this area will be *deferred* from harvest for one rotation. If the area in a unit is located on unsuitable (see preceding paragraph) land, the specific area will be *removed from the suitable timber acreage in perpetuity*. However, this specific area may also be used to meet marten and goshawk recommendations for this proposed harvest, provided that the specific area is classified by the TPIT guidelines as an area that contributes to marten and goshawk forest structure requirements. All proposed areas that would be used to meet the TPIT recommendations adhere to these guidelines.

[3] TEAMS Planning – a Forest Service enterprise group – replaced URS on the Tuxekan Project following the publication of the DEIS

Karst Resources

Karst development on Tuxekan Island is widespread and numerous areas contain caves protected under the Federal Cave Protection Act of 1988. Potential karst areas have been identified and categorized as low, medium, or high vulnerability. High-vulnerability areas are not suitable for programmed timber harvest.

Activities associated with timber harvest have been designed to avoid high-vulnerability karst to the extent possible and to meet Forest Plan standards and guidelines for low- and moderate-vulnerability areas. Areas of high vulnerability karst have been reserved to meet Forest Plan requirements for karst and other requirements such as marten and goshawk standards and guidelines. A small amount of classified road construction is proposed across or adjacent to high vulnerability karst land. Individual roads require specific design considerations to avoid compromising karst resources.

Location of Camps and Maintenance Facilities

Nichin Cove, is in the eastern portion of the project area, contains a small Forest Service building. There are no facilities are in the project area. A small, floating camp on State tidelands is also located in Nichin Cove. This camp does not have Forest Service special use permits for water intake or shore ties. There are no timber conversion facilities on Tuxekan Island. The logs would be transported to the LTF at Nichin Cove for shipment to off-island processing plants.

East of the project area is the community of Naukati, a 10- to 15-minute boat ride from Tuxekan Island. Naukati is located two miles north of Nichin Cove on Prince of Wales Island and has a store, a fuel station, telecommunications, and limited equipment repair facilities. It has a highway connection to the other main communities on Prince of Wales Island and is also a base for charter water transportation. Naukati receives air services from companies based in Ketchikan and other locations.

Threatened, Endangered, and Sensitive Species

Biological assessments have been completed for the Forest Plan, and consultation has been held with the responsible federal agency for all threatened or endangered species potentially inhabiting the project area. Standards and guidelines have been applied as needed to ensure that any listed species or its habitat will not be adversely affected.

Biological evaluations for all sensitive species potentially inhabiting the project area have been completed. The Forest Plan contains standards and guidelines for each designated sensitive species, and these are incorporated into the project as applicable.

Wildlife Habitat

The conservation strategy described in the Forest Plan FEIS (USDA Forest Service 1997b), including all species-specific standards and guidelines, is considered sufficient to maintain

habitat for viable populations of all species potentially located within the project area, including small endemic terrestrial mammals.

Currently, second-growth stands are too young for commercial thinning. In the future, commercial thinning to accelerate the development of old-growth conditions will provide important benefits to wildlife.

Great Blue Heron Rookeries and Raptor Nests

The Forest Plan contains standards and guidelines that provide for the protection of goshawk and raptor nests and great blue heron rookeries. Surveys were completed for goshawks, other raptors, and great blue herons.

Marten and Goshawk Requirements

Tuxekan Island is part of the high-risk North Central Prince of Wales biogeographic province for marten and goshawk habitat where more than 33 percent of the original productive old growth (POG) has been harvested in each of the value comparison units (VCUs) of the project area. In such areas, proposed timber harvest units more than two acres in size in high value habitat must meet specific Forest Plan standards and guidelines. Standards and guidelines include retaining:

1. An average of 30 percent canopy closure throughout the harvest unit
2. An average of at least eight large trees 20- to 30-inch diameter at breast height (DBH) or greater per acre for future snag recruitment
3. An average of at least three large decadent trees per acre
4. An average of at least three pieces per acre of downed material (logs 20 to 30 inches or greater in diameter and 10 feet long), generally distributed throughout the harvest unit.

Harvest units are designed to meet marten and goshawk standards and guidelines. One of the two silviculture prescriptions, STS, proposed for the project meets marten and goshawk requirements by design. STS generally harvests less than 25 percent of the basal area, which leaves continuous forested cover, exceeding marten and goshawk requirements.

CCR is the one proposed silvicultural treatment that warrants additional areas being deferred from harvest to meet marten and goshawk standards and guidelines. According to the Forest Plan, the retained trees for the marten and goshawk requirements should have a reasonable assurance of windfirmness and should be uniformly distributed throughout the stand, but they may be clumped for operational concerns or ecological opportunities. In the project area, retaining essentially unharvested patches or clumps using the CCR silvicultural prescription was often preferable to uniform distribution of reserve trees for several reasons.

- Many of the originally planned harvest units have a moderate to high risk of windthrow.
- Some of the more common and economical logging systems used in southeast Alaska may damage or destroy retained trees (especially downhill cable logging systems).
- Worker safety is improved when reserve trees are clumped.

- Some unharvested patches could be incorporated into corridors to improve connectivity of reserve areas.
- Some unharvested patches could increase the size of areas with interior old-growth habitat.
- CCR for part of a suitable and available stand that is surrounded by second growth would leave a reserve area to provide refugia for plant species to repopulate the adjacent stands as they mature.

To meet canopy closure and stand structure requirements when retained structure is clumped, TPIT clarification recommends using a 1:1 factor for stand retention (USDA Forest Service 1998). For example, assuming an initial canopy closure of 60 percent, the TPIT clarification recommends for every acre harvested an equal number of unharvested acres should be retained in the unit. Also, in the harvested area, retention of 10 percent or more of the existing structure would be accomplished by leaving 10 percent or more of the original stand basal area, in trees greater than 16 inches dbh. All proposed harvest units in the project include at least an equal number of acres to be harvested and acres to be deferred or reserved from harvest.

Harvest Prescriptions

Harvest prescriptions in use on the Tongass National Forest are described in the Forest Plan. There are three basic regeneration methods: even-aged, two-aged, and uneven-aged. Even-aged methods include clearcutting with less than 15 percent basal area in reserves (CC), seed tree, and shelterwood. Two-aged methods include clearcuts with more than 15 percent or more basal area in reserves (CCR), seed tree with reserves, and shelterwood with reserves. Uneven-aged methods include single-tree selection (STS), group selection, and group selection with or without reserves.

Silvicultural methods considered for the project include uneven-aged STS and two-aged CCR. Each of these regeneration methods is used in varying proportions in the alternatives.

Volume Conversion MBF to CCF

For planning purposes, 1 MBF (1,000 board feet) equals 2 CCF (200 cubic feet). Therefore, volumes and costs expressed in MBF values are doubled for CCF. In reality, tree species, tree size, tree form and other factors affect the actual conversion ratio from MBF to CCF. The actual ratio is determined when a proposed sale is cruised.

High-hazard Soils

Soils in the project area have been categorized with a mass movement index (MMI) of 1 through 4. MMI 4 soils are the most susceptible to mass movement activity and are not suitable for programmed timber harvest according to the Forest Plan.

Slopes Greater Than 72 Percent

Proposed harvest units with adjoining areas of two acres or more, on slopes greater than 72 percent, received an on-site analysis of slope and Class IV channel stability. Their potential downslope and downstream effects were assessed. No harvest is proposed on soils with a very high Mass Movement Index (MMI 4). No programmed harvest is proposed on adjoining areas over one-acre where the slope is greater than 72 percent, except where corridors are needed to facilitate skyline logging. The total acreage cut through these corridors ranges from 0.6 acre to 0.8 acre, depending on the action alternative.

Descriptions of Logging systems

Ground-based logging

The primary ground-based logging system that is practical in the moist soils of Southeast Alaska is shovel logging. In this system, a "shovel," or log loader, transports logs by repeatedly swinging them from stump to landing. Shovel logging is used primarily where the terrain is not excessively wet and soil impacts would be slight, as the machine is stationary while swinging the logs. The shovel typically takes only one pass over a piece of ground to reposition itself. Even where the soil is wet, impacts can be greatly reduced by having the shovel make a mat of slash on which to travel.

Cable logging

Cable systems employ steel cables operated by a stationary winch, or "yarder," running through a 50- to 110 foot tower to provide lift to the logs being yarded (or logged). The simplest cable system (highlead) is common in Southeast Alaska. Because highlead provides only limited lift to the logs being yarded, this system can disturb the soil. The preferred cable systems now commonly used in Alaska are the various skyline systems, in which an additional cable, or "skyline," is used to lift the logs being yarded, suspending them either partially or fully above the ground. The suspension results in less site disturbance than that due to highlead. Two skyline systems have been analyzed for the analysis area: running skyline and slackline. A running skyline uses two suspended moving cables: a mainline and a haulback line. Logs are hauled to a landing using chokers attached to the haulback line. A slackline uses three cables and a carriage that moves the chokers. In favorable topographic conditions, a slackline can provide longer yarding distances than a running skyline.

Helicopter logging

For helicopter logging, logs are flown, fully suspended by helicopter, from stump to landing. Consequently, there is negligible soil impact resulting directly from this type of yarding system. Furthermore, yarding distances can be longer than those required for cable logging, thus reducing the need for road construction. However, a large landing area is required for helicopter operation (typically 1 acre). Helicopter logging is expensive and economically

feasible in Alaska for only short flight distances or for harvesting the most valuable timber grades and species.

Timber Stand Damaging Agents in Tuxekan

Biotic Damaging Agents

The major biotic damaging agents are dwarf mistletoe and decay fungi. Insects and animals are only minor damaging agents in the analysis area.

Dwarf Mistletoe

The occurrence of dwarf mistletoe in late successional western hemlock stands is widespread throughout Southeast Alaska from Portland Canal north to Haines (Shaw 1981–82), including the Tuxekan project area. It is one of the most destructive diseases in old-growth forests of Southeast Alaska, affecting mostly western hemlock and, to a lesser extent, Sitka spruce. The small-scale (canopy gap) disturbance pattern in the old forests of coastal Alaska favors the short-range dispersal mechanism of hemlock dwarf mistletoe and may explain the common occurrence of the disease in this area (USDA Forest Service 1997–2000). Dwarf mistletoe can spread to trees as much as 10 meters apart. In general, dwarf mistletoe reduces the vigor and growth rate of the host tree so that infected trees require a longer period of time to mature and often produce lower quality timber (Boyce 1961). Dwarf mistletoe often produces cankerous swellings at the point of infection of limbs or main stems. The cankers provide an entrance for wood-destroying fungi, which can lead to significant fiber losses. Trees are often snapped off at the site of the canker during wind storms.

Dwarf mistletoe is present in all old-growth units in the Tuxekan project area. Many of the units included in the unit pool were rated low for the occurrence of dwarf mistletoe. Twelve units in the current unit pool were rated moderate, and two were rated moderate-high (Table G-1).

Table G-1. Timber Stand Damaging agents in the Tuxekan unit pool

Unit Number	Stand Development	Stand Structure	Dwarf Mistletoe	Decay Fungi	Windthrow Potential
556-409	Mature	Even	Low	Moderate	Moderate-High
556-410	Mature/Old Growth	Uneven	Low	Low	High
556-412	Old Growth	Uneven	Moderate	Moderate	High
556-413	Old Growth	Uneven	Moderate - High	Moderate	High
556-451	Old Growth	Uneven	Low	Moderate	High
556-452	Mature/Old Growth	Uneven	Low	Low	High
557-400	Not Surveyed				
557-402	Old Growth	Uneven	Moderate-High	High	Moderate
557-403	Old Growth	Uneven	Low-Moderate	Low	Moderate
557-404	Old Growth	Uneven	Low	Moderate	Moderate
557-405	Mature/Old Growth	Uneven	Low	Moderate	High
557-424	Mature/Old Growth	2 Story	Low	Low	Moderate
557-426	Mature/Old Growth	Uneven	Moderate	Moderate	High
557-427	Old Growth	Uneven	Low	Low	Moderate-High
557-430	Old Growth	Low	Low	Moderate	High

Table G-1. Timber Stand Damaging agents in the Tuxekan unit pool

Unit Number	Stand Development	Stand Structure	Dwarf Mistletoe	Decay Fungi	Windthrow Potential
557-433	Mature/Old Growth	Low	Low	Moderate	High
560-401	Mature/Old Growth	Low	Low	Moderate	High
560-402	Mature/Old Growth	Moderate	Moderate	Moderate	Very High
560-403	Mature	Low	Low	Moderate	High
560-404	Old Growth	Moderate	Moderate	Moderate	High
560-405	Old Growth	Moderate	Moderate	Moderate	High
560-406	Old Growth	Moderate	Moderate	Moderate	High
560-407	Mature/Old Growth	Low	Low	Moderate	High
560-408	Mature/Old Growth	Low	Low	Low	High
560-409	Mature/Old Growth	Low	Low	Low	High
560-411	Old Growth	Low	Low	Moderate	Moderate
560-412	Old Growth	Moderate	Moderate	Low	Moderate
560-416	Old Growth / Second Growth	Even / Uneven	Moderate	Low	High
560-417	Mature/Old Growth	Even / Uneven	Low	Moderate	High
560-426	Mature/Old Growth	Even	Low	Low	Very High
560-428	Mature/Old Growth	Even	Low	Moderate	High
587.2-410	Not Surveyed				
587.2-412	Old Growth	Uneven	Low	High	High
587.2-413	Mature/Old Growth	Even / Uneven	Moderate	Low	Extreme
587.2-414	Old Growth	Low	Low	Moderate	High
587.2-417	Old Growth	Moderate	Moderate	High	Very High
587.2-419	Mature/Old Growth	Low	Low	Moderate	High
587.2-424	Old Growth	Moderate	Moderate	Low	High
587.2-425	Old Growth	Moderate	Moderate	Low	Moderate

Decay Fungi

Decay caused by heart- and root-rotting fungi is probably the greatest single cause of disease-related timber volume loss in Alaska (Laurent 1974), and such damage is present within the Tuxekan project area. Approximately one-third of the old-growth timber volume in Southeast Alaska is defective largely due to heart-rotting fungi (USDA Forest Service 1997–2000). Heart rot causes considerable damage in all conifer species in Southeast Alaska but is more common in western hemlock, mountain hemlock, and Sitka spruce. Decay centered in the boles of trees can weaken the support structures, thereby leading to breakage. As the broken portion of the tree falls to the forest floor, it may wound adjacent trees and lead to eventual infection of the damaged trees. This is a continual process in old-growth forests in Southeast Alaska and contributes to the diversity of the stand structure.

Decay-causing fungi are present in all stands within the analysis area. Three units in the current unit pool were rated high for the occurrence of decay fungi. The remaining units were rated moderate or low.

Appendix G – Other Supportive Information

Abiotic Damaging Agents

Windthrow

The major abiotic damaging agent is windthrow. The loss of trees, singly or in groups, to the effects of wind is the number one factor affecting stand structure and development in Southeast Alaska. High-wind events occur in Southeast Alaska each year, causing considerable damage and loss. One study indicated that wind was responsible for approximately one-fourth of the annual tree mortality in Southeast Alaska during a 7-year period (Hutcheson et al. 1975).

Wind disturbance creates some beneficial effects. Mixing of soil associated with uprooted trees is thought to contribute to the prevention of impermeable soil layers. Site productivity may be enhanced through soil mixing, thus promoting nutrient cycling. Other beneficial effects include the exposure of mineral soil, which favors the regeneration of Sitka spruce and cedar and the creation of large woody material for wildlife use.

Windthrow plays an important role in stand development. Wind disturbance occurs over a continuum dependent on topographic features (Nowacki and Kramer 1998). Stand structure can give clues to prevailing wind disturbance patterns. In wind-sheltered areas, stands develop old-growth characteristics through a process called "gap replacement," whereby small openings in the forest canopy, created from wind damage, are colonized by brush and eventually conifer species. Wind damage results in uprooted trees and breakage, or "stem snap." Stem snap from wind disturbances often occurs in conjunction with stem rots, which can create weak points in the boles of trees. Falling trees may wound nearby trees, thereby predisposing them to fungal infections. Over time, a two-layered stand and eventually a multilayered stand develops, in which small openings are continually created and colonized. Unharvested stands in areas where wind disturbance promotes gap replacement may reach a degree of stability with respect to wind. Selective harvesting emulates gap patterns in natural stands.

Traditionally, forest managers have applied large-scale clearcuts in an attempt to minimize losses due to windthrow. Current Forest Service direction calls for the use of alternatives to clearcutting when those alternatives will meet goals and objectives. In addition, the habitat requirements of species such as marten result in reduced clearcut size. As a result, clearcut openings, especially in wind-prone areas, should take advantage of naturally occurring windfirm edges such as muskegs and low-density stands as well as topographic features that deflect the effects of wind.

Existing windthrow within a stand is an important indicator of windthrow hazard. Certain conditions are indicators of windthrow hazard for individual trees as well as stands. The windthrow history of a stand can be determined from field observations. These conditions, as well as a stand's windthrow history, were used to evaluate the windthrow hazard for each unit.

Conditions that predispose individual trees to wind damage include the following:

- Height/diameter ratio: A height/diameter ratio greater than 100 is very unstable for most species.

- Size of crown: A large crown relative to a tree's rooting structure may predispose that tree to windthrow. This is especially true when a stand is opened up because of logging or natural occurrence.
- Rooting depth: Shallow soils inhibiting root penetration decrease a tree's ability to withstand the force of high winds.
- Degree of exposure: Open-grown trees are generally more windfirm than trees developing in a closed stand.
- Root and stem decay: Root decay weakens a tree's support structure, whereas stem decay may cause a tree to break.
- Lean: Leaning trees have a greater disposition to windthrow due to increased gravitational stresses.
- Seedbed: Trees established on old logs or the upturned roots of old windfalls develop stilt roots (as the rooting structure decays, the tree is left with exposed roots). Trees with stilted roots tend to be less windfirm.
- Species: Generally, western hemlock, mountain hemlock, and Sitka spruce are less windfirm than western red cedar and Alaska yellow-cedar.
- Characteristics that predispose stands to wind damage include the following:
- Stand age: Old-growth stands (at or near successional climax) are less windfirm than young-growth or second-growth stands.
- Stand height: Tall stands are more susceptible to wind damage.
- Stand density: Dense stands on productive sites are more susceptible to wind damage, especially when opened through harvesting or natural occurrence. Open-grown stands have developed individual tree characteristics that tend to reduce windthrow potential.
- Topography and aspect: Areas exposed to southerly storm winds are generally more susceptible. Topography and aspect sometimes combine to accelerate winds, thereby leaving stands more susceptible to wind damage.

In the Tuxekan project area, high or very high windthrow hazard generally occurred in areas with exposure due to topography or adjacent logging. Table G-1 provides the windthrow potential for each unit in the current unit pool.

Appendix H - Response to Comment
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Introduction

Background

A Draft Environmental Impact Statement (DEIS) was prepared by URS, a contracting firm, in 2001. The DEIS was initially issued for comment December 10, 2004. Because of inaccuracies in Appendices B and C, the road and unit cards, it was necessary to issue amended appendices on January 21, 2005 with a 45 day extension of the comment period; which closed March 7, 2005. TEAMS Planning, a Forest Service enterprise group, in conjunction with Tongass National Forest resource specialists, have checked and updated the project for current conditions and information in preparation of the Final Environmental Impact Statement (FEIS).

Commenters

Pamela Bergmann, Regional Environmental Officer – Alaska, USDI, Office of Environmental Policy and Compliance, Anchorage, Alaska

Christine B. Reichgott, Manager, NEPA Review Unit, EPA Region 10, Seattle, WA

Susan Schrader for Dave Sherman, Community Organizer, Southeast Alaska Conservation Council, Juneau, AK

Gabriel Scott, Alaska Field Representative, Cascadia Wildlands Project, Cordova, AK

Corrie Bosman, Conservation Director, Sitka Conservation Society, Sitka, AK; Larry Edwards, Forest Campaigner, Greenpeace, Sitka, AK; Mark Rorick, Chair, Juneau Group of the Sierra Club, Juneau, AK

Owen J. Graham, Executive Director, Alaska Forest Association, Ketchikan, AK

Joanne Daunt, Portland, OR

Joe Donohue, ACMP Project Specialist, State of Alaska, Department of Natural Resources, Office Of Project Management/Permitting, Alaska Coastal Management Program, Juneau, AK

Public Comments on the Tuxekan Project DEIS and Forest Service Response[1]

Pamela Bergmann

Comment 1.1 *The Department of the Interior has reviewed the U.S. Forest Service December 2004 Draft Environmental Impact Statement (EIS) for the proposed Tuxekan Island Timber Sale, including materials included in the Tuxekan Island Timber Sale DEIS Errata. We believe that the following comments need to be addressed in the Final EIS. These comments are submitted in accordance with the Fish and Wildlife Coordination Act, the Multiple Use-Sustained Yield Act, the National Forest Management Act, the Alaska National Interest Land Conservation Act, and the National Environmental Policy Act.*

Tuxekan Island consists of approximately 17,000 acres of Tongass National Forest and 1,000 acres of state and private land. Between 1961 and 1986, approximately 44 percent of the island was clearcut. Approximately 60 miles of logging roads were constructed, and more than 60 percent of the roads remain open, with the remainder in various stages of deterioration or decommissioned. Ten rural communities in the region have documented subsistence use of wildlife resources of Tuxekan Island. Three roadless areas of less than 1,000 acres are inventoried on the island. The preferred alternative proposes to harvest 573 acres for 18.9 million board feet of timber, to construct 9.5 miles of new road, and to reconstruct 31.3 miles of existing road. In addition, the boundaries of the small old-growth habitat reserves on Tuxekan Island would also be adjusted by the proposed alternative.

Detailed comments on the Draft EIS and our recommendations for the Final EIS are included in the attachment. In summary, we have the following concerns regarding the proposed timber sale that we believe need to be addressed in the Final EIS:

Response 1.1 Comment Noted.

Comment 1.2 *Fragmentation, old-growth habitat corridors, and connectivity: We believe the action alternatives give insufficient consideration to the historical forest fragmentation on Tuxekan Island, and the effect that further proposed fragmentation will have on viable wildlife populations and subsistence use.*

[1] Comment numbers correspond to commenter numbers above.

Response 1.2

This project included Interagency Committee meetings to review small OGRs and to develop the Interagency Committee recommendations for small OGRs. The development of the Interagency Committee recommendation considered the levels of past harvesting on the island. The Interagency Committee recommendation has been incorporated into Alternatives 4 and 5. In addition, Alternative 2 incorporates the recommended OGRs with only minor modifications. For more information, see the FEIS (*Chapter 3, Issue 3a, Habitat Connectivity*, pp. 3-87 through 3-97).

Corridors have been given consideration and were used to develop Alternative 4. In addition, Alternatives 2 and 5 maintain these corridors to varying degrees as addressed in the FEIS (*Chapter 3, Issue 3a, Habitat Connectivity*, pp. 3-87 through 3-97).

The Responsible Official's preferred alternative is Alternative 5, which incorporates the Interagency Committee recommended OGRs as well as addresses connectivity. Additional analysis of the direct, indirect and cumulative effects of fragmentation on habitat connectivity has been included in the FEIS.

Comment 1.3

Designation of small Old-Growth Reserves: We believe the small Old-Growth Reserves currently proposed focus primarily on low-moderate productivity forestland that is of limited value to old-growth dependent wildlife populations. We further believe boundary adjustments to render these small Old-Growth Reserves more consistent with design criteria established by the Forest Plan are needed.

Response 1.3

The current old growth reserves do not meet Forest Plan direction. As discussed in the FEIS, an Interagency Committee of biologists made recommended changes to the OGRs to meet Plan direction and improve habitat. Alternatives 4 and 5 incorporate the Interagency Committee recommendations to modify the small OGR boundaries. Alternative 2 incorporates most of the recommended boundary changes.

Alternative 5 is the Agency Preferred Alternative.

Comment 1.4

Project effects upon subsistence use: We believe the determination of project effects upon subsistence use understates the effects of historic logging that has removed much of the deer winter range that once existed on the island. This condition elevates the critical nature of the remaining mature, low-elevation old growth in the project area. We also believe that further logging of remaining stands is likely to adversely affect deer, which is the primary subsistence species on Tuxekan Island.

Response 1.4

Comment Noted. Potential effects on deer habitat and subsistence use are documented in the *FEIS, Chapter 3, Chapter 3, Issue 3b, Deer Habitat and Subsistence Use*, pp. 3-99 through 3-122.

Comment 1.5

Commercial tree selection in high-volume old-growth timber stands: The Draft EIS suggests that selective removal of large diameter spruce and cedar trees from high volume old growth stands, with removal of 30-50 percent of the canopy, will benefit wildlife habitat. We believe the potentially harmful effects of such a prescription may outweigh any possible benefit to wildlife habitat.

Response 1.5 The DEIS (p. 3-135) included a statement about the harvest units creating more forage, partially mitigating forage being lost in existing second growth stands that are moving into the stem-exclusion stage. Other effects (habitat loss) are disclosed throughout the wildlife analysis *FEIS, Chapter 3, Wildlife* (goshawk, marten, deer winter range etc), pp. 3-161 through 3-198.

Comment 1.6 *To minimize impacts to wildlife populations and subsistence users, we recommend that 300 year rotations be applied to Tuxekan Island and that removal of high-volume, low-elevation, and old-growth timber be portioned out, on a decadal basis, over that rotation.*

Response 1.6 Outside the scope of this decision. Already decided by the Tongass Forest Plan.

Comment 1.7 *We also recommend that the corridors that connect the remaining fragments of high-volume, old-growth timber, as displayed in Chapter 2, Figure 2-2 of the Draft EIS, be preserved from further timber harvest.*

Response 1.7 These corridors have been given consideration and were used to develop Alternative 4. In addition, Alternatives 2 and 5 maintain these corridors to varying degrees as addressed in the FEIS (*Issue 3a, Habitat Connectivity* section). Riparian and beach/estuary buffers also provide corridors.

Comment 1.8 *Likewise, we recommend that Unit 556-409 (on the northern tip of Tuxekan Island) be deferred from harvest until approximately halfway through such a rotation [300 yrs], to allow it to function as winter habitat for deer, nesting habitat for murrelets and goshawks, and dispersal habitat for a variety of organisms, until surrounding harvested areas mature enough to adequately fulfill those roles.*

Response 1.8 The peninsula on the northwest corner of Tuxekan next to El Capitan Island is currently old growth forest. This area of the island was identified as an unroaded area and has not been previously harvested. All action alternatives do include one CCR unit (556-409) in this area, along with a temporary road to access it. Effects of entry into this area are addressed in the analysis for wolves. Because this 38-acre unit would still be surrounded by low elevation, old growth forest, the ability for animals to use this as a corridor to El Capitan Island would not be significantly affected.

Comment 1.9 *We believe that the May 2002 Old-Growth Reserve boundaries recommended by the Interagency Team should be adopted for this project area. That recommendation incorporates and balances a variety of specific elements as required by Appendix K of the Forest Plan. Among the features that are incorporated into the interagency recommendation, but lacking from most of the proposed reserves, are elements such as deer winter range, goshawk and murrelet nesting habitat, retention of the largest remaining blocks of productive old growth, and circular rather than linear shape to maximize interior forest. Regardless of which alternatives are ultimately selected, the Final EIS needs to discuss the basis for these Old-growth Reserve proposals, and consistency of those proposals with Appendix K.*

Response 1.9 See Response to Comment 1.3

Comment 1.10 *Thank you for the opportunity to comment on this document. If you have any questions, please contact Bruce Halstead, Juneau Fish and Wildlife Field Office Supervisor, at 907-780-1160.*

Response 1.10 Comment Noted

Comment 1.11 *The four Value Comparison Units (VCUs) that constitute the Tuxekan Island project area represent some of the most heavily logged and roaded areas of Prince of Wales, and of the Tongass National Forest (Tongass), resulting in a degree of habitat fragmentation that exceeds that of most other areas of the Tongass. This habitat fragmentation would be exacerbated by construction of additional roads into roadless second-growth stands, 1 and into remaining fragments of old growth.*

Response 1.11 Yes, implementation of any of the action alternatives would result in an increase of forest fragmentation. Additional analysis of the direct, indirect and cumulative effects of fragmentation on habitat connectivity has been included in the FEIS. Because the project area lies in a high risk biogeographic province where over 33 percent of the productive old growth has been converted to young stands, additional marten and goshawk guidelines have been incorporated into the project design, per Forest Plan direction.

Comment 1.12 *Historical harvest typically targeted higher volume timber stands (Volume Classes 6 and 7), which display complex vertical canopy structure valuable for deer and other wildlife populations important to local communities. Volume Class 6 and 7 timber represents 81 percent of the proposed timber harvest, although these volume classes represent only 58 percent of the remaining old-growth timber. Remaining fragments of high volume old-growth timber is very important to some wildlife populations as the surrounding mosaic of second-growth timber enters the stem exclusion phase, which lacks both forage and snow interception capability.*

Response 1.12 Volume Class information has been included in the analysis for biodiversity, as well as for goshawks, deer, and hairy woodpeckers (as MIS for cavity nesters). Refer to the *FEIS, Chapter 3:, Biodiversity* Section (pp. 3-77 to 3-99); *Wildlife* Section (pp. 3-161- to 3-198)

Comment 1.13 *Most of the logging on Tuxekan Island occurred between 1961 and 1986, prior to establishment and application of Tongass Land Management Plan (Forest Plan) prescriptions for riparian areas, beach fringe, and wildlife retention areas. As a result, nearly 20 percent of the riparian corridors along the salmon and trout streams of Tuxekan Island were clearcut, 3 wildlife retention areas were not designated, and many miles of beach fringe were removed. The Forest Plan 1997 wildlife conservation strategy places heavy reliance upon riparian and beach wildlife corridors connecting designated Old Growth Reserves (OGRs). Corridors can be protected by not harvesting within them or by managing the matrix of habitat between reserves.4 Since the latter option cannot be used as a result of the past clearcutting of this area, these corridors can only be protected by not harvesting timber within them.*

Response 1.13 The effects of past harvesting in riparian buffers and the beach/estuary zone are included in the FEIS. There would be no additional harvesting in these areas. The Forest Plan does not require maintenance of landscape connectivity between small OGRs, but because of extensive past harvesting on the island (including some in riparian areas and beach buffer), connectivity was incorporated into developing the alternatives, and is addressed in the analysis.

Comment 1.14 *We recommend that the relationship between the system of OGRs and the remaining corridors of high-volume old growth timber that provide connectivity among them, be given primary consideration in the environmental analysis in the Final EIS.*

Response 1.14 This project included Interagency Committee meetings to review small OGRs and to develop the Interagency Committee recommendation for small OGRs. The Interagency Committee recommendation was incorporated into Alternatives 4 and 5. In addition, Alternative 2 incorporates the recommended OGRs with only minor modifications. For more information, see the FEIS (*Chapter 3, Issue 3a, Habitat Connectivity*, pp. 3-87 through 3-97).

Corridors have been given consideration and were used to develop Alternative 4. In addition, Alternatives 2 and 5 maintain these corridors to varying degrees as addressed in the FEIS (*Chapter 3, Issue 3a, Habitat Connectivity*, pp. 3-87 through 3-97).

The Responsible Official's preferred alternative is Alternative 5, which incorporates the recommended Interagency Committee OGRs as well as addresses connectivity.

Comment 1.15

Forest Plan standards and guidelines require that project-level planning on the Tongass consider providing additional connectivity in areas where the old-growth strategy may not be fully functional due to past harvest activities.5 We believe that Tuxekan Island falls into this category. Therefore, we recommend that the interdisciplinary team consider this question; document these considerations in the environmental analysis of the Final EIS; and formulate alternative(s) that will provide for that additional connectivity. The Department of the Interior's 1996 review of the Draft EIS for Revision of the Forest Plan recommended that the most heavily logged and seriously fragmented areas of the Tongass be logged at a reduced rate to diminish the risk to potentially-affected wildlife species. Specifically, we recommended that in fragmented areas where wildlife and subsistence use are important to forest users, harvest of remaining high-volume, low-elevation, old-growth timber occur only over an extended rotation until surrounding second-growth forest stands could be expected to provide wildlife habitat characteristics then being provided by old-growth. In the same review, we recommended that existing corridors between OGRs be protected from further harvest.

We recommend that such an extended rotation be included in the Final EIS, and that the remaining high-volume, low-elevation, old-growth timber be metered out, on a decadal basis, over that rotation. Furthermore, we recommend that in the Final EIS, the corridors that connect the remaining fragments of high-volume, old-growth timber, as displayed in Chapter 2, Figure 2- 2 of the Draft EIS, be preserved from further timber harvest.

Response 1.15

See *FEIS, Chapter 2*, *Alternatives Eliminated from Detailed Consideration, Extend rotation for existing POG and reserve existing corridors between small OGRs*, p. 2-5. Rotations already decided by the Tongass Forest Plan.

Comment 1.16 *Most OGRs on Tuxekan Island are composed of low to medium-volume forest, non-commercial scrub forest, non-forested muskeg, and linear beach and riparian buffers, rather than the circular blocks that provide interior forest conditions, as specified by the Forest Plan.8 To reduce habitat impact to vulnerable, old-growth dependent species and subsistence users of those species, we recommend that in the Final EIS, Unit 556-409 be deferred from harvest until surrounding harvested stands on the north end of the island have matured. This unit is within the largest remaining block of high-volume, low elevation old-growth timber on the northwestern tip of Tuxekan Island and provides important deer winter range and good nesting habitat for murrelets and goshawks. Because of its proximity to El Capitan Island, it is likely an important dispersal corridor for animals moving between the two islands.*

Response 1.16 An assessment of the existing old growth reserves was done by an Interagency Committee of biologists, and their recommendations for modifying the OGRs have been incorporated fully into Alternatives 4 and 5 (and mostly into Alternative 2).

The peninsula on the northwest corner of Tuxekan next to El Capitan Island is currently old growth forest. This area of the island was identified as an unroaded area and has not been previously harvested. All action alternatives do include one CCR unit (556-409) in this area, along with a temporary road to access it. Effects of entry into this area are addressed in the analysis for wolves. Because this 38 unit would still be surrounded by old growth forest, the ability for animals to use this as a corridor to El Capitan Island would not be significantly affected.

Comment 1.17 ***Designation of Small Old-Growth Reserves***

We believe each of the four existing small OGRs in the project area is deficient in either acreage or composition elements required by Appendix K of the Forest Plan. An interagency group of biologists from the U. S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), and the Alaska Department of Fish and Game (ADFG) developed recommendations to modify the existing OGRs, as required by the Forest Plan Record of Decision, to address these shortcomings. Alternatives 2 and 4 of the Draft EIS would incorporate the interagency recommendations, while the proposed action (Alternative 3) would not.

In our view, modifications proposed in Alternative 3 do not meet Appendix K design criteria in several important ways. Notably lacking from the proposed reserves are deer winter ranges, goshawk and murrelet nesting habitat, and the largest remaining contiguous blocks of productive old-growth, all of which are to be included in OGRs. In addition, most of the lands added to the OGRs by the proposed action to meet acreage minimums consist either of areas that have already been designated for protection under other Forest Plan standards (such as beach fringe and riparian buffers) or second-growth forest. We believe adoption of the alternative reserves proposed in Alternative 3 would unnecessarily impact old-growth dependent wildlife by allowing fragmentation of remaining old growth blocks and corridors.

By contrast, the interagency recommendations, which we continue to support and recommend, were designed to complement the wildlife conservation strategy established by Forest Plan and meet the design criteria documented in Appendix K of that plan. Specific shortcomings of the existing OGRs, and how the

interagency recommendations address these shortcomings, are described below (all descriptions are from the interagency report):

VCU 5560: The existing OGR consists of essentially all of the medium-volume strata, plus adjacent beach fringe, and does not include the largest intact stand of high-volume old growth. The interagency recommendation would include south-facing slopes of two drainages, resulting in protection of most of the high-quality deer wintering habitat, most of the potential goshawk and murrelet nesting habitat, and most of the largest remaining block of contiguous old growth.

VCU 5570: The existing OGR includes a mix of low-, medium-, and high-volume strata, plus non-commercial scrub and openings. Remaining low-elevation corridors to the south and west are not protected. The interagency proposals would expand the reserve to the south to protect an old-growth corridor to the north fork of Karheen Creek, west to protect a similar corridor to Scott Lagoon, north to include adjacent, low-elevation old growth, and southeast to include remaining forest habitat between the existing OGR and regenerating clearcuts. This configuration would protect existing corridors, most of the remaining winter habitat for deer, known marbled murrelet nesting habitat, and the best potential goshawk nesting habitat.

VCU 5600: The existing OGR is highly fragmented by timber harvest from every decade since the 1930's. Although it does include the Karheen Lake system, which supports substantial runs of sockeye, coho, and pink salmon, and provides important wintering habitat for trumpeter swans, the remainder of the OGR is composed primarily of muskeg, non-commercial forest, and low-volume forest, with small inclusions of high-volume forest on north-facing slopes. The interagency recommendation would expand the reserve to the north, to include high-volume, south-facing forest stands to the north of Karheen Lakes, and to the east to include a forested corridor to the low-elevation pass between the east fork of Karheen Creek and a large lake in VCU 5872.

VCU 5872: The existing OGR is composed of muskeg, scrub forest, low- to medium volume beach fringe and riparian forest. Nearly all of the productive old-growth in the OGR is within linear beach fringe and riparian buffer instead of protecting more circular

Patches that would provide interior forest conditions or existing corridors remaining between old-growth blocks. The interagency team recommended that the existing OGR be moved to the south along the western boundary of the VCU to help protect the largest remaining block of old-growth habitat and form a contiguous, protected block with the OGR of VCU 5600.

Recommendations for the Final EIS:

We recommend that in the Final EIS, an alternative be selected that incorporates the interagency recommendations, as described in the May 2002 interagency report. In the event the Final EIS includes any boundary adjustments, we request that the Final EIS disclose the basis for this decision and the consistency of any adjustments with the design criteria established by Forest Plan, including habitat elements of the criteria that go beyond simple acreage calculations.

Response 1.17 See Response to Comment 1.3.

Comment 1.18

Project Effects Upon Subsistence Use

We believe the proposed action may have detrimental effects upon declining deer populations and local subsistence users. Clearcutting of approximately 7,500 acres, or 44 percent of the project area, during the last century has fragmented or removed most of the winter range upon which deer depend. The Forest Plan Revision concluded that the Tuxekan area could expect a loss of capability of 54 percent, which is 318 percent greater than the loss expected for the Tongass as a whole (Forest Plan Final EIS, Pg. 3-371, 373). This represented the second most severe loss of habitat capability on the Tongass, exceeded only by the adjacent Kosciusko Island. ADFG personnel indicate that low density of deer on Tuxekan Island results from the prevalence of closed-canopy, second-growth habitat. Local residents indicate that deer populations have been declining for a number of years. Subsistence harvest of deer has declined dramatically over this same period of time.

The Draft EIS indicates that cumulative effects of past and future timber harvests will significantly restrict subsistence use of deer. We believe this project may contribute to a long-term decline in subsistence opportunity.

Recommendations for the Final EIS:

We believe that alternatives considered in the Final EIS need to include Tuxekan Island subsistence resources as a priority consideration. This may be accomplished by adopting the recommendations outlined above under "Fragmentation, Wildlife Corridors and Connectivity."

Response 1.18

FEIS, Chapter 3, Issue 3-Wildlife, incorporates concerns about impacts to subsistence users. Issue 3 in part states "**…**Proposed harvesting in the project area will reduce high value deer habitat **adversely impacting subsistence users** [emphasis added]**.**" Alternatives 4 and 5 were designed to address this issue by retaining wildlife habitat and providing for old-growth connectivity in the interior of the island including designation of 3,942 acres of small OGRs as listed in the "Old-growth Habitat Reserve Review" for Thorne Bay and Craig Ranger Districts, Tongass National Forest, May 2002 (USDA 2002).

Cumulative impacts of past, present and reasonably foreseeable future actions under all alternatives, including the no action alternative, indicate that projected future harvest levels would fall within 10 percent of the population of deer available for humans (after reduction for wolf predation). However, the cumulative effects of this project together with the possibility of a deep snow winter and associated deer mortality may represent a significant possibility of a significant restriction of subsistence use of deer.

Comment 1.19 ***Commercial tree selection in high volume old growth***

Approximately 14 percent of the acres harvested by the proposal will utilize helicopters to remove large diameter spruce and cedar, and leave smaller diameter hemlock, spruce, and cedar. This approach will reduce canopy closure by 30 to 50 percent. The Draft EIS suggests that this selective harvest technique will benefit wildlife habitat.

We are concerned that this acreage occurs within the high volume strata, on an island where most such forest stands have been eliminated or fragmented. Volume Class 6 and 7 forest stands have a unique importance in the life cycle of deer because of their ability to perform the dual function of snow interception and browse production during severe winters. The elimination of either function eliminates this unique winter value.

Removal of 30 to 50 percent of the canopy would eliminate interception of heavy snow loads during severe winters and browse on the forest floor would no longer be available during this most critical point in the population cycle of deer. Light selection logging spread over an appropriate spatial scale (i.e., no more than 6 trees removed from any 0.5 acre) may be suitable on deer winter ranges. Openings any larger than this are likely to regenerate as thick second growth stands with little or no wildlife value.

Recommendations for the Final EIS:

We believe that in the Final EIS, these stands should be retained as old growth habitat until a much later point in this rotation or an extended rotation, to provide decades of continuous value for deer production, subsistence and recreational hunting, and serve as a safeguard against those infrequent winters that can decimate a deer population and dependent wolf populations. If harvest is to occur in these high volume old-growth stands, wildlife habitat values can be maintained by removal of no more than 6 trees from any 0.5 acre, as described by Kirchhoff and Thomson (1998), which is a standard we believe should be adopted for this timber sale.

Response 1.19 The standards and guidelines in the plan were designed to provide adequate protections, while meeting timber objectives in this LUD. The harvesting of 12 trees per acre would do little toward meeting objectives for these stands.

Selective harvesting would allow for an increase in summer forage for deer. This is declining on the island due to second growth stands that are moving into the stem exclusion stage and losing understory species.

Volume Class information has been included in the analysis for biodiversity, as well as for goshawks, deer and hairy woodpeckers.

The FEIS does disclose that the harvest units would no longer provide high-value winter habitat due to the loss of canopy and snow interception. This is factored into the deer model, as well as displayed in the discussion about high-value deer habitat.

There was no modified prescription developed that would only take 6 trees per ½ acre.

Christine B. Reichgott

Comment 2.1

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Tuxekan Island Timber Sale (CEQ No. 040557). We are submitting comments in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act.

The DEIS proposes a No Action Alternative (Alternative 1) and three Action Alternatives (Alternative 2-4). Alternative 2 proposes commercial timber harvest on 443 acres of forest, 82% using clear cut method of tree harvest and 64% of harvest would be on moderate vulnerability karst. It would also include 6 miles of new road construction, (0.2 miles constructed in high karst vulnerability land), 3.7 mile of those miles of new road would be temporary, and 25.9 mile of road reconstruction. Alternative 3 (Proposed Alternative) proposes commercial timber harvest on 573 acres of forest, 86% using the clear cut method, and 99% on moderate vulnerability karst. It would also include 9.4 miles of new road construction (0.29 miles constructed in high karst vulnerability land), of which 5.9 miles would be temporary, and 31.3 miles of road reconstruction. Alternative 4 proposes commercial timber harvest on 381 acres of forest, 79% on moderate vulnerability karst. It would include 5.4 miles of new road construction (0.25 miles constructed in high karst vulnerability land), of which 2.8 miles would be temporary, and 25.9 miles of road reconstruction.

We have rated this project EC-2 (Environmental Concerns - Inadequate Information). Based on potential adverse impacts of the project on water quality, fisheries and wildlife habitat, we recommend selection of a modified version of Alternative 4, that would eliminate areas from timber harvest that would require construction of new roads on high vulnerability karst formations. We also have concerns with loss of wetlands and the economics related to the proposed timber sale. This rating and a summary of our comments will be published in the Federal Register. A copy of the rating system used in conducting our review is enclosed for your reference.

Response 2.1

See *FEIS*, *Chapter 1, Project Background,* pp 1-5 to 1-7, for a discussion of road relocations to eliminate karst concerns for road construction.

See *FEIS, Chapter 2*: *Alternative 5*, pp. 2-22 to 2-23; *Comparison of Alternatives*, pp. 2-29 to 2-46.

See *FEIS, Chapter 3* for additional analysis of, karst (pp. 3-45 to 3-65), water quality and wetlands (pp. 3-21 to 3-32), fisheries (pp. 3-197 to 3-218), and wildlife (pp. 3-161 to 3-218).

Only 3.1 acres of wetlands will be impacted by this project (*FEIS, Chapter 3, Hydrology, Wetlands, Table 3-19. Types and amounts of wetlands within proposed harvest treatment areas in the Tuxekan Project cumulative watershed effects area by Alternative, p. 3-39.*

Comment 2.2 *Since all action alternatives would potentially have adverse effects on fisheries, forest connectivity, and habitat for deer, marten and wolves, we recommend that the USFS consider including another alternative in the Final EIS. This alternative could be derived based on a timber financial efficiency analysis and address the need to minimize impacts to fisheries, high-value marten, deer and marbled murrelet habitat and wetlands. This could be accomplished by reducing timber harvest beyond the levels in Alternative 4, and configuring the project to maximize economic efficiencies. This may involve removing areas that would be logged by helicopter and building fewer miles of new roads.*

Response 2.2 This alternative was evaluated and conclusions are shown in the *FEIS, Chapter 2, Alternatives Eliminated from Detailed Consideration, No helicopter harvesting, fewer roads, and harvesting only high value timber units*, pp. 2-4 to 2-5.

Comment 2.3 *At many locations in the draft EIS, the USFS raises the issue of the export of western red cedar. We highly recommend that this issue be explained in more detail in the final EIS. From the tone of the document it appears to be a significant issue to the USFS and the economics of timber harvest in the Tongass National Forest and could potentially affect the value of the timber sale. If the preference is to export western red cedar, we recommend a discussion of how this will affect the local economy. We also recommend that the final EIS address the fate of western red cedar that is harvested during a clear cut and its importance to the ecology of the island.*

Response 2.3 Applications for cedar export permits on Forest Service timber sales are dealt with on a case-by-case basis and approved at the Regional Forester level. Permits are based on the availability of local markets. The economic analysis of all alternatives has been revised for the FEIS. While it is not possible to predict the economic environment for the future date at which the timber sale could occur, revised volume estimates and changed market conditions now indicate that the estimated bid value is positive under all action alternatives considered without export of Western red cedar.

A discussion of the potential impact to job and income should the export of cedar be approved has been incorporated in the *FEIS, Chapter 3, Issue 2: Timber Sale and Local Economics*, pp. 3-65 to 3-75.

Comment 2.4 ***Karst***
We recommend that no roads be located in high vulnerability karst due to its highly erodible nature and potential impact on water quality and aquatic habitat. This could be accomplished by evaluation of an alternative route or eliminating the units that would need to be accessed by the road through high vulnerability karst. The designation of areas as high vulnerability karst is described as areas where resource damage threats associated with land management activities have an appreciably greater impact than low or moderate vulnerability karst. The Tongass National Forest Land and Resource Management Plan, Standards and Guidelines for karst and cave resources, describes high-vulnerability karst areas as of high significance and sensitivity. It states that karst lands found to be of high vulnerability will be identified and removed from the commercial forest lands suitable land base. Due to its ecological importance, we recommend that impacts to high vulnerability karst be avoided

Response 2.4 Any high vulnerability karst lands, identified within proposed unit boundaries, have been removed from timber harvesting as required by Karst and Cave Standards and Guidelines in the Forest Plan.

See *FEIS*, *Chapter 1, project Background,* pp. 1-5 to 1-7, for a discussion of road relocations to eliminate karst concerns for road construction.

Comment 2.5 ***Water Yield***

We recommend that the final DEIS attempt to evaluate the effect of increased water yields that would result from logging on moderate vulnerability karst to fisheries habitat. Although the document states that the changes in water yield will not be permanent, the DEIS should describe the effect of temporary increases in water yield to streams and potential changes to aquatic habitat. We recommend an attempt be made to determine hydrologic risk from the potential change in flow regime from management activities and its subsequent impact to stream channel stability.

Response 2.5 See *FEIS, Chapter 3: Hydrology, Water Yield*, pp. 3-35 to 3-37, and *Sediment Yield,* pp. 3-37 to 3-45; *Karst*, pp. 3-45 to 3-65 for discussion on your question regarding hydrologic risk from potential changes in flow regime from management activities. Increases in sediment yield can occur with increases in water yield-generally from streambank erosion.

Increases in streambank erosion and sediment yield can have negative impacts on aquatic habitat by altering stream channel morphology and decreasing foraging and quality spawning and rearing habitat. Soil displacement in and around stream channels would be minimized by RMA and RAW buffers.

Under Alternatives 2, 3, 4, and 5, no harvesting would occur along Class I, II, and III streams within the designated RMA buffer widths.

Comment 2.6 *EPA recommends a more detailed assessment and prediction of potential sediment yields to streams within and downstream of the project area. As described in the DEIS, clear-cuts on karst can create heavy soil erosion. Also, the DEIS states that Tuxekan Island was heavily logged using the most sediment producing methods from 1920s through the mid-1970s. We recommend that the FEIS indicate whether the water quality and habitat of the streams in the project area have fully recovered from the past management activities.*

Response 2.6 No cumulative sediment yield models exist for Southeast Alaska. Therefore it is difficult to produce a detailed assessment and prediction of potential sediment yields to streams for this project. For this reason, analysis for both direct/indirect and cumulative effects for sediment yield was made using a variety of techniques. For the Tuxekan Project sediment yield analysis, alternatives cannot be compared using strictly a quantitative approach. Quantitative data was used where possible and literature review and field observation was used to further strengthen the analysis.

See *FEIS, Chapter 3, Hydrology*, pp. 3-14 through 3-65, for the discussion of streams and water quality within the project area.

Comment 2.7

The DEIS makes the assumption that sediment from roads on Tuxekan Island will have negligible effect on sediment yields to streams due to the low usage of roads on the Islands. However, the 2001 Roadless Conservation Rule Final EIS notes that road construction, reconstruction and maintenance may cause or accelerate surface erosion and initiate landslide events. Water washing over the exposed soil of a road causes erosion of fine sediment. Permanent and temporary road construction and reconstruction can cause an increased risk of surface erosion, depending on local site characteristics. The greatest concern lies where land management activities occur in areas of high precipitation, steep slopes, soils prone to surface erosion, and terrain susceptible to landslides. The Roadless Conservation Rule Final EIS listed coastal areas on the Tongass National Forest in Alaska as more susceptible to soil loss and sedimentation from roads.

Response 2.7

Regardless of the alternative selected, minimal increases in sediment yield to Tuxekan Project Area rivers and streams would be realized. Impacts from sediment are not be expected to produce effects to water quality, fish habitat, and cave and karst resources that would significantly alter existing condition.

Newly constructed road/stream crossing areas would contribute sediment to rivers and streams annually as long as the road prism exists. The majority of roads would be built on slopes less than 30 percent. No roads would be built on slopes over 67 percent. It is not anticipated that roads would trigger mass movement events, as the Tuxekan Project Area is an area of low topographic relief. Where steep slopes do occur in the project area, thin well-drained soils are prevalent-limiting the ability for large mass wasting events from roads.

Less than 0.1 percent of the project area RMAs would be disturbed by road building. No timber harvesting would occur within RMAs. This percentage represents a small disturbance, and negligible effects are anticipated. Seven to ten stream crossings would be constructed, depending on the alternative selected for the Tuxekan Project. Road WEPP estimates that these crossings would produce between 11.2 and 16.0 tons of sediment annually to project area rivers and streams depending on the alternative selected.

Between 382 and 570 acres of timber harvesting would occur depending on which action alternative is selected. As mentioned, no harvesting would occur in RMAs and one potential site tree from the edge of the RMA. This would insure that erosion caused by harvesting activity would be buffered before reaching stream channels. At most, eight acres of timber harvesting and one acre of yarding would occur on slopes greater than 72 percent. Field reconnaissance verified that these are areas of thin well-drained soils over bedrock, making the possibility for mass wasting events is negligible.

The Tuxekan Project would slightly alter water yield dynamics. Watersheds currently above the 20 percent threshold of concern would recover at essentially the same point in time no matter if the Tuxekan Project is implemented or not (see “Water Yield” section). Therefore, sediment yield increases from changes in water yield would be negligible or nonexistent.

For further information, refer to the *FEIS, Hydrology, Sediment Yield section*, pp. 3-37 to 3-45.

Comment 2.8 *The DEIS states that moderate-vulnerability karst poses a limited threat for organic material, sediment or debris. It also describes moderate-vulnerability karst as a mosaic of shallow organic soils moderately to well developed and visible at the surface. Due to the high amount of timber harvest on moderate-vulnerability and carbonate rock, we recommend that the Final EIS include a more detailed evaluation of the potential effects of the proposed timber harvest to sediment yields to streams. We are particularly concerned about the effects of harvest on moderate-vulnerability karst and steep slopes. We understand that newer timber harvest methods reduce the sediment yield compared to past techniques that were used on the forest. However, we recommend a more quantitative discussion of the effects of management activities on fine sediment in streams. Can the USFS assess and compare potential detrimental disturbance from soil displacement, soil compaction, and soil puddling for all action alternatives? Also is there a way to estimate the increased sediment loading to streams caused by timber harvest and road construction, reconstruction and maintenance? Increases in sediment delivery and routing through a significant number of stream networks is likely the most significant management-induced effect on water quality. A quantitative assessment would allow a more detailed assessment of cumulative effects.*

Response 2.8 See analysis of karst in *FEIS, Chapter 3, Karst*, pp. 3-45 to 3-65.

Per Forest Plan direction all carbonate rock is considered karst (USDA, 1997a, Ch. 4). Given that direction, analysis was based upon considering the potential for effects to all carbonate rocks. Please refer to the Hydrology, Water Yield Direct/Indirect Effects, Sediment Direct/Indirect Effects, and the related cumulative effects sections. The Sediment Direct/Indirect Effects section in the FEIS uses the current Road Condition Survey, soils and mass movement potential information from the FEIS, and the Road Water Erosion Prediction Project (Road WEPP) were used to help develop a more quantitative approach to discussing potential sediment increases, related to roads, to streams. In addition effects are discussed under Karst Direct/Indirect Effects: Water Yield, Direct/Indirect Effects: Water Quality and Sediment sections, and related cumulative effects sections for a more detail analysis of the potential effects to sediment yield, streams, and karst.

In addition, the consequences of soil displacement, compaction and puddling are discussed in *FEIS, Chapter 3, Soils*, pp. 3-2 through 3-15.

Due to the general unreliability of sediment models in Southeast Alaska, analysis for direct/indirect and cumulative effects for sediment yield was made using a variety of techniques. For the Tuxekan Project sediment yield analysis, alternatives can not be compared using strictly a quantitative approach. Quantitative data was used where possible and literature review and field observation was used to further strengthen the analysis.

The soil productivity section, affected area and direct/indirect effects in the soils analysis provides greater detail on current research findings in the context of management direction towards answering these questions.

Timber harvesting and road building are the main contributors of sediment within the project area. Sediment risk to streams from roads, timber harvest, and mass wasting was assessed within the Hydrology Sediment Yield section of the FEIS.

In summary, only 0.1% of existing RMAs would be disturbed by road building and timber harvest. RMA buffers, as laid out using 1997 Forest Plan Standards and Guidelines would protect water quality by filtering sediment from disturbed areas. Sediment would reach project area rivers and streams where stream/road crossings are constructed. Between 7 and 10 stream crossings are to be installed, depending on the alternative selected. This equates to between 11.2 and 16.0 tons of sediment/annually as long as the road is present. Constructed roads and timber harvesting activity are not expected to increase the risk for mass movement. No roads would be built on slopes greater than 67% and the majority of roads to be constructed would be below 30%. Between 5 and 8 acres of timber harvesting is expected on slopes greater than 72%. These areas were field reviewed to determine the risk of failure after harvesting activity. These slopes are dominated by bedrock with thin soils, making the potential for mass movement null. Overall, the project area is dominated by low topographic relief with low mass movement potential.

Increases in water yield generally trigger increases in sediment yield. After complete implementation of the Tuxekan Project in 2012, one watershed will be above the 20% threshold of concern. No activity is scheduled in this watershed-therefore; the watershed is above the threshold of concern due to previous harvest and road building activity. No further increases in sediment yield are expected from increases in water yield from the Tuxekan Project.

Comment 2.9 *The DEIS (S-3) states that for timber production the desired future condition is to have healthy tree stands in a balanced mix of age classes. However, the DEIS proposes to conduct harvest on the majority of the project area using the clear cutting approach (79-86% of total acreage). It is EPA's understanding that clear cutting leads to even aged stands.*

Response 2.9 The desired condition is to have a balanced mix of stand age classes, not tree age classes within each stand. While most stands would be two-aged, the age class distribution among stands approaches a balanced mix. Clearcutting does result in even aged stands, but can also create two-aged stands (Forest Service, 2006). As clearcuts are completed in an area over several decades, each would result in a new stand with a different age. In the FEIS, Chapter 3 (pp. 3-140 to 3-145), the Silviculture Section discloses the acreages by age class resulting from each alternative.

Comment 2.10 *We understand that the potential for windthrow is an important consideration when selecting silviculture methods. However, the DEIS states that the primary focus of the Proposed Action (Alternative 3) is timber production and economics. Alternative 3 would result in the most acres converted to single age-class stands. The Modified 1997 Forest Plan states that its direction for these lands is to, "seek to reduce clear-cutting when other methods will meet land management objectives". We recommend that the final EIS provide a discussion of the suitability of conducting selective logging within the project area over a larger area.*

Response 2.10 Each stand considered for harvesting is reviewed in light of several criteria. That evaluation leads to a recommended regeneration method (CCR, STS, etc.) The silviculture section in the DEIS discussed the two regeneration methods considered, and it reviewed the criteria used in selecting a harvesting method. The DEIS continues by explaining that the potential for windthrow constrained many units to the CCR prescription. Windthrow alone is not the deciding factor. Operational feasibility, economic, disease, decay, regeneration potential and martin and goshawk habitat considerations also weigh into the final harvesting recommendation. Also, see *FEIS, Chapter 2, Alternatives Considered and Eliminated from Detailed Consideration; Alternatives to clearcutting,* p. 2-2 to 2-3.

Comment 2.11 ***Wetlands***

EPA recommends that the final EIS describe the wetland resources on Tuxekan Island in more detail, such as, wetlands that are of the highest value, which perform the most important functions, their location, and how timber harvest would impact wetlands value and function. We suggest that the final EIS discuss those cumulative impacts from the loss of function and value that would be lost and include potential impact from future timber harvest on suitable lands on the Island. We recommend that the final EIS define productive (i.e., high value wetlands), and include a map of the project area that shows all wetlands, including those that meet the definition of high value. We also recommend that the final EIS describe in detail mitigation measures in the wetlands section that will be applied to this project, such as buffer widths, etc. to protect wetland resources. The draft EIS states that partial log suspension will be used to mitigate effects to wetlands and refers the reader to the Logging Systems section under Silviculture. The Silviculture section does not adequately describe the protection afforded to wetlands from implementation of the partial log suspension. Also, why is full log suspension not used to ensure greater protection to wetland areas?

Response 2.11 No wetlands would be impacted by road building activities under any action alternative. Under all action alternatives, the following wetland types would be impacted by harvesting activities (*FEIS, Chapter 3, Hydrology, Wetlands, Table 3-19*, p. 3-31):

2.8 acres of wetland type FES

0.3 acres of wetland type FW

Harvesting activities may disturb these wetlands by compacting soils, removing vegetation, or altering hydrology. None of the wetlands would be filled. None of the wetlands to be impacted are considered sensitive or

high value by the Tongass. During project implementation, efforts would be made to avoid these areas as much as possible.

Comment 2.12

Fisheries

We recommend that a discussion of the potential effects to fish habitat and areas important for spawning from short term increases in fine sediment yield to streams for each action alternative, be included in the final EIS. The DEIS states that this analysis is outside the scope of the project, however since there are impacts predicted to fisheries we suggest that the final EIS discuss which streams may be affected and the overall effects to the fish population.

Response 2.12

Alternative 3 proposes timber harvesting on the greatest number of acres (570 total acres) and proposes to construct the greatest amount of new road (3.8 miles new construction and 5.9 miles of temporary). Alternative 4 would harvest the fewest acres (382 total acres) and least amount of road construction (2.9 miles new construction and 2.8 miles of temporary). Alternatives 2 and 5 fall between the other action alternatives. Alternative 2 proposes harvesting 441 acres and construction of 2.3 miles of new road and 3.7 miles of temporary road. Alternative 5 proposes timber harvesting on 523 acres, construction of 3.4 miles of new road and 5.3 miles of temporary roads.

There would be six stream crossing under Alternative 4, seven stream crossings under Alternative 2 and eight under Alternatives 3 and 5. Construction of a bridge or arched culvert over a Class I stream in Watershed 18 would occur under all action alternatives. In addition, an additional bridge or arched culvert would be constructed under Alternatives 3 and 5 as a result of reconstruction of road 1470500. Five Class IV culverts are proposed under Alternatives 2, 3, and 5; and 3 Class IV culverts are proposed under Alternative 4.

Fine sediment generated from project activities associated with the action alternatives could negatively impact sensitive spawning habitat. However, stream buffers, application of wind firm buffers on specific units, avoidance of steep/unstable slopes, and road construction and stream crossing mitigation measures would be expected to minimize negative direct and indirect effects to a point where impacts to spawning gravel and salmonid production would not be detectable relative to the existing background conditions.

By implementing Forest Plan Standards and Guidelines, BMPs, and utilizing other design and mitigation measures discussed above; direct, indirect, and cumulative effects of the proposed activities on MIS species and habitat and Essential Fish Habitat would be minimized. The proposed action alternatives would meet Forest Plan fisheries and riparian standard and guidelines, requirements under the Endangered Species Act, Recreational Fisheries and the Alaska Coastal Zone Management Act.

Comment 2.13 ***Timber Supply and Economics***

With each action alternative, the market value has been estimated to be below base rate value for all but one of the last 15 quarters so that the timber harvested would have to be offered at a higher rate than market value. We suggest that the final EIS describe the source and accuracy of the data used to determine market demand for this proposed timber sale. Since one of the objectives of this timber sale would be to "seek to provide a timber supply sufficient to meet the annual demand for the Tongass National Forest", we recommend a more detailed analysis of how this timber sale would accomplish this goal. We recommend that the Final EIS attempt to predict the likelihood of bids for this timber sale and how this would affect future timber sales on this Island. It should also discuss the fate of trees that are potentially harvested but not sold due to lower than expected market demand.

Response 2.13 The annual market demand for timber is developed based on the document "Evaluating the Demand for Tongass Timber" (Morse, 1998), which forms the basis for how these estimates are developed. Final procedures are located in Responding to the Market Demand for Tongass Timber (Morse, 2000). The document, Tongass National Forest Timber Sale Procedures (Morse, 2000), explains the process used to determine the volume of timber offered each fiscal year. The Regional Office updates the demand analysis annually. The results of that analysis form the basis for the Tongass' planned timber offer for the current year of the Ten Year Timber Sale Schedule pending sufficient funding to do so.

Appendix A of the FEIS displays how the Tuxekan Island Timber Sale project relates to the Forest-wide timber program for the next 10 years, and discusses market demand for the Tongass. Additionally, The analysis of *Issue 2: Timber Supply and Economics* section in Chapter 3 of the FEIS describes the economics of the timber sales alternatives. While it is not possible to predict the economic environment for the future date at which the timber sale could occur, revised volume estimates and changed market conditions now indicate that the estimated bid value is positive under all action alternatives considered.

Predicting the likelihood of bids would require knowledge of future economic conditions. If the sale appraised deficit at the time of offer, management options could be applied to improve the economics or the sale could be rescheduled for offer at a later date under improved market conditions.

Harvesting of timber does not occur unless a timber sale contract has been awarded. All trees harvested have been purchased by the timber sale contractor who would be required to remove all merchantable material under the terms of the timber sale contract.

Susan Schrader for Dave Sherman

Comment 3.1 *The following comments are submitted on behalf of the Southeast Alaska Conservation Council (SEACC) on the Tuxekan Island Timber Sales Draft EIS. Alternative 3, the proposed action, calls for logging over 18.9 mmbf of old-growth timber on Tuxekan Island in Sea Otter Sound at a public cost of close to two million dollars. Of the four alternatives examined, Alter-native 3 impacts the largest area, destroys the largest amount of high-quality deer habitat, and requires the greatest number of additional roads to be built on an island with demonstrated unique soil characteristics.*

SEACC is a coalition of eighteen volunteer citizen conservation groups in fourteen communities across Southeast Alaska, from Ketchikan to Yakutat. SEACC's individual members include commercial and sport fishermen, Alaska Natives, tourism and recreation business owners, small-scale high-value added wood product manufacturers, hunters and guides, and South-east Alaskans from all walks of life. SEACC is dedicated to safeguarding the integrity of South-east Alaska's unsurpassed natural environment while providing for the sustainable use of our region's resources.

Response 3.1 Comment Noted

Comment 3.2 *Tuxekan Island has been heavily impacted by past clearcut logging and road-building activities. In preparing yet another timber sale for this area, the Forest Service must fully account for this legacy of habitat degradation and old-growth forest liquidation. Any timber sale planned for the area must maintain the island's ability to function as an ecological unit. We find it hard to believe that the agency can log another 18.9 million board feet from this island without sealing its ecological fate.*

Response 3.2 Comment Noted

Comment 3.3 *Given the island's legacy of extensive clearcutting and roadbuilding, and the fact that all action alternatives would potentially have adverse effects on fisheries, forest connectivity, karst features, and habitat for deer, marten and wolves, we recommend that any future timber sales use the existing road system only. This would minimize the cost of logging, allowing greater participation by small volume loggers, as well as reduce the impacts to habitats and soils. This would require the inclusion of a new alternative in the Final EIS (FEIS). This alternative would be based on an accurate timber financial efficiency analysis and address the need to minimize impacts to fisheries, high-value marten, deer and marbled murrelet habitat, karst landscapes and wetlands. This could be accomplished by reducing timber logging rates below the levels in Alternative 4, and reconfiguring the project to maximize economic efficiencies.*

Response 3.3 This alternative was evaluated and discussed in the *FEIS, Chapter 2, Alternatives Eliminated From Detailed Consideration, No helicopter harvesting, fewer roads, and harvesting only high value timber units,* pp. 2-4 to 2-5.

Comment 3.4

Tuxekan Island contains significant karst resources. Karst is an internationally recognized land feature that is unique to Southeast Alaska. Before any logging or road-building takes place on the island, a full karst and cave inventory should be completed. The Forest Service should consider employing local cave experts like members of the Tongass Cave Project to complete such an inventory.

Although the Forest Service has completed karst inventories in the past, these inventories have been found wanting. For example, after the Forest Service surveyed Kosciusko Island, the Tongass Cave Project conducted their own survey. In doing so, they found approximately 75% more karst resources than the Forest Service survey. Although this is not an indication that the Forest Service intentionally overlooked this unique and fragile feature, it does indicate the need and value of conducting intensive, on-the-ground inventories of karst terrain. Indeed, the Tongass Cave Project's work on Kosciusko influenced the agency's management of that island.

Response 3.4

The karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. See the *FEIS, Chapter 3, Karst*, pp. 3-45 through 3-65.

A variety of methods was used to analyze potential project related effects on karst resources. Existing data resources were reviewed prior to field work conducted by URS Corporation in 2000, including the Soil Resource Inventory Report for the Ketchikan Area (USDA, 1994a), the Karst Vulnerability Report for Tuxekan Island (Harza, 1995), as well as other maps and reports. Black and white aerial photos taken in 2000 as part of a LIDAR survey provided recent photo documentation of the project area. LIDAR is a laser-based technique for obtaining detailed topographic information. In addition to conventional aerial photographic interpretation LIDAR was used to assist in aerial photographic interpretation. LIDAR is significantly more accurate in defining potential karst features and drainages. This information was then used by the IDT to help determine which units needed field review. URS conducted a field review of units in the spring and summer of 2000. Field verification was conducted by personnel trained in the identification of karst topography. Karst development and the potential for adverse impacts to the karst resource were then documented in the field.

The data collected by URS during the field survey was used to generate slope hazard and karst/feature/karst vulnerability layers in the GIS database, to develop karst vulnerability maps for the project. The resultant data, analysis and interpretation were then summarized in the Soils, Geology, Mineral, and Wetlands Resources Inventory Report for the Tuxekan Island Timber Sale (URS, 2001).

Additional field work was conducted in June of 2004 by qualified Forest Service personnel from the Thorne Bay Ranger District and from the Forest Service enterprise group, TEAMS Planning, to further evaluate potential project related effects to karst. (See *FEIS, Chapter 1, Project Background,* pp. 1-5 to 1-7 for a discussion of road relocations to eliminate karst concerns for road construction.) The results were then summarized in a report (Baichtal, 2005a-d, North, 2005c, and d) and integrated into the analysis and interpretation of potential project impacts on karst.

Comment 3.5

To fully comply with Forest Plan, we recommend that no roads be built on high vulnerability karst because of the need to insure conservation of karst values, the highly erodent nature of this landscape, and potential impacts on water quality and aquatic habitat from disturbance of this fragile resource. The Forest Service must also evaluate alternative routes or consider alternatives that eliminate the units that would need to be accessed by the road through high vulnerability karst. The designation of areas as high vulnerability karst is described as areas where resource damage threats associated with land management activities have an appreciably greater impact than low or moderate vulnerability karst. Forest Plan's Standards and Guidelines for karst and cave resources describe high-vulnerability karst areas as a resource of high significance and sensitivity. It states that karst lands found to be of high vulnerability will be identified and removed from the commercial forest lands suitable land base. Due to its ecological importance, we recommend that impacts to high vulnerability karst be avoided.

Response 3.5

This option to eliminate karst concerns from road construction was evaluated by the interdisciplinary team. Additional fieldwork was completed and measures were taken to move any proposed roadwork from high vulnerability karst. Refer to the *FEIS, Chapter 1, Project Background,* pp. 1-5 to 1-6, for a complete discussion of road relocations to eliminate karst concerns for road construction.

In addition, the karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. Updated findings are displayed in the *FEIS, Chapter 3, Karst*, pp. 3-45 through 3-65.

Comment 3.5a

The Purpose and Need statement is to log about 20 mmbf from Tuxekan Island. The Forest Service also uses "seeking to meet market demand" for Tongass timber as part of its rationale for including a timber target in the Purpose and Need statement, thereby restricting the range of alternatives to be considered by the public and decision-makers. We believe the Purpose and Need statement should be broader than simply meeting a narrow timber target as identified in the proposed action. The Purpose and Need statement should reflect the goals and objectives for the various land use designations represented in the project area.

The Purpose and Need for this timber sale is directly related to the Tongass National Forest Land Management Plan (Forest Plan) of 1997. As you are no doubt aware, Forest Plan is currently being contested in court, due to the Forest Service's admitted error in calculating the international demand for Tongass timber. It seems unwise to plan a large timber sale that would impact an already stressed ecosystem when the very goals and objectives of the forest-wide planning document are in doubt.

In addition, seeking to meet market demand, as outlined in Section 101 of the Tongass Reform Law, is not a compulsory duty. This is the law in both the Alaska Federal District Court and in the 9th Circuit Court of Appeals.[1] Section 101 of the Reform Law makes seeking to meet market demand subordinate to the agency's primary responsibility to fulfill NFMA's multiple use, sustained yield, and resource protection requirements, and the requirements of other applicable law. Therefore, the agency cannot use Section 101 to rationalize a decision to sacrifice other forest resources and uses by calling for even more logging and road building in this heavily impacted area.

[1] *See Alaska Forest Association v. United States, No. J94-007 CV (JKS), slip op. At 1-2 (D. AK Oct. 19, 1995)(citations and footnote omitted) ; see also Alaska Wilderness Rec. & Tourism Association v. Morrison, 67 F.3d 723, 731 (9th Cir. 1995)*

Response 3.5a

Even though the Forest Land and Resource Management Plan (Forest Plan) for the Tongass National Forest is being contested in court, the court has not enjoined its implementation. Therefore, the Forest Plan continues to guide management of the Forest.

The Tuxekan Island Timber Sale project responds to goals and objectives identified in the Forest Plan, one of which is to provide a timber supply sufficient to meet the annual and planning cycle market demands for Tongass National Forest timber. Others include providing resource production opportunities and employment for local communities. Appendix A of the FEIS displays how the Tuxekan Island Timber Sale project relates to the Forest-wide timber program for the next 10 years, and discusses market demand for the Tongass.

The range of alternatives considered includes the no action alternative, under which no timber would be harvested, and four action alternatives with volumes ranging from 12.4 to 19.6 MMBF. The effects of the alternatives relative to the goals and objectives of the land use designations and impacts to other resources and uses are evaluated in Chapter 3 of the FEIS.

Comment 3.6

Furthermore, it seems clear that the economics of this sale will not bear profitable fruit for the Forest Service or the U.S. taxpayers. Given that it will cost $295.35 per thousand board feet, in roading and logging costs, in the Preferred Alternative, and that the current market price is approximately $5.08 per thousand board feet, this sale is obviously an economic loser for the U.S. taxpayer. Even if the logged western red cedar is exported in the round, the expected bid per thousand board feet is only $31.76. Although slightly better, this is still but a fraction of the costs required to log the timber. In a time of increasing economic scarcity and depressed timber prices, to continue to road and log on the unique karst ecosystem in Southeast Alaska makes no sense

Response 3.6

The analysis of Issue 2: Timber Supply and Economics section in Chapter 3 of the FEIS describes the economics of the timber sales alternatives. While it is not possible to predict the economic environment for the future date at which the timber sale could occur, revised volume estimates and changed market conditions now indicate that the estimated bid value is positive under all action alternatives considered.

Results of the financial efficiency analysis are meant to only be relative comparisons across alternatives, not exact expected selling values. When the sale appraisals are prepared just prior to the offering of the sale package, more exact inventories (cruise data) and more exact selling values would be used depending on the market conditions at the time. The sale would at that time be offered to perspective bidders who would speculate according to market conditions. The sale would only be sold if a profit can be realized. Additionally, Alternative 5 was added and considered in the FEIS to address concerns regarding timber sale

economics. The effects of this alternative are discussed in Chapter 3 under *Issue 2: Timber Sale and Local Economics (pp 3-65 to 3-76)*.

For more information on road relocations to eliminate karst concerns for road construction refer to the *FEIS*, *Chapter 1, Project Background*, p. 1-5 to 1-7.

Comment 3.7

This story is all too common and well-known. In 2000, the Forest Service estimated that 90-95% of all existing timber contracts were unprofitable.[2] We recommend that the Final EIS attempt to predict the likelihood of bids for this timber sale and how this would affect future timber sales on this Island.

[2] March 28, 2002 memo, Steve Brink, Deputy Regional Forester for Natural Resources, to Chief of the U.S. Forest Service.

Response 3.7

Timber demand is addressed in the Forest Plan and in Appendix A of this FEIS. The Tuxekan Island Timber Sale Project is one of many timber sales on the Tongass intended to help meet public demand for wood products. Actual demand projections and mill capacity are beyond the scope of this project. Timber demand is dynamic, with prices fluctuating up and down in response local, regional, National, and international market conditions. It is not possible to predict the economic environment for the future date at which the timber sale could occur.

The analysis of *Issue 2: Timber Supply and Economics* section in Chapter 3 of the FEIS (pp. 3-65 to 3-76) describes the economics of the timber sales alternatives. Revised volume estimates and changed market conditions now indicate that the estimated bid value is positive under all action alternatives considered.

Results of the financial efficiency analysis are meant to only be relative comparisons across alternatives, not exact expected selling values. When the sale appraisals are prepared just prior to the offering of the sale package, more exact inventories (cruise data) and more exact selling values would be used depending on the market conditions at the time. Sales would then be offered to perspective bidders who would speculate according to market conditions. The sale would only be sold if a profit can be realized.

Comment 3.7a

In May 2003, the Alaska Department of Labor observed "[l]ow prices for milled timber, ... a national glut of lumber, and sharp Canadian competition all point to continuing erosion in the logging and wood products industries."[3] By December of 2003, the Alaska Department of Labor found that demand for Tongass timber has fallen to historic lows and the timber industry is in a state of decline due to global timber market forces. The department further stated that these forces will not be reversed in the foreseeable future, and that any potential growth in the industry lies not in increasing the timber supply, but in making better use of today's small but steady sup-ply.[4] The Forest Service needs to disclose any information it has indicating a change in these trends.

Despite this well-documented decline and the equally well documented importance of other sectors of Southeast's economy, the Forest Service continues to invest millions of U.S. tax dollars into this declining industry. Because of this, in part, the agency finds itself unable to maintain Forest Service roads. How

many jobs would be supported if the Forest Service developed a program to address backlogged road maintenance and culvert replacement on Tongass lands on Prince of Wales, Tuxekan, and other nearby islands?

[3] *Neal Gilbertsen, Economy continues to contract in Southeast, Alaska Economic Trends, May 2003, published by the Alaska Department of Labor and Workforce Development.*

[4] *Neal Gilbertsen and Dan Robinson, Natural Resources: Mining and Timber, Alaska Economic Trends, December 2003, published by the Alaska Department of Labor and Workforce Development.*

Response 3.7a

The Tuxekan Island Timber Sale project responds to goals and objectives identified in the Forest Plan, one of which is to provide a timber supply sufficient to meet the annual and planning cycle market demands for Tongass National Forest timber. Others include providing resource production opportunities and employment for local communities.

Appendix A of the FEIS displays how the Tuxekan Island Timber Sale project relates to the Forest-wide timber program for the next 10 years, and discusses market demand for the Tongass.

Analysis of a program to address backlogged road maintenance and culvert replacement on the Tongass National Forest is beyond the scope of this project.

Comment 3.8

The DEIS states that for timber production the desired future condition is to have healthy tree stands in a balanced mix of age classes. However, the preferred alternative proposes to clearcut a majority of the project area (495 of 573 acres, or 86%). Clear-cut logging leads to even aged stands. How will the proposed alternatives achieve the Forest Service's objective of pro-viding for a mix of age classes on Tuxekan Island?

Given that the Forest Service calculates an average sustainable future clear-cutting rate of 70 acres per year in its preferred alternative, it seems unwise to clearcut 7 times this amount in one timber sale. According to this calculation, that represents over 7 years of timber being liquid-dated in one timber sale, an amount that is clearly not sustainable given a rotation period of at least one hundred years.

Response 3.8

The section referred to in the DEIS was confusing. It was trying to illustrate the idea that at the project area scale, this kind of work is sustainable. There is no requirement to show sustainable harvest levels at the project scale. It is only appropriate at the Forest Plan scale.

The desired condition is to have a balanced mix of stand age classes, not age classes within each stand. While most stands would be two-aged, the age class distribution among stands is in a balanced mix. Clearcutting does result in even aged stands, but can also create two-aged stands (Forest Service, 2006). As clearcuts are completed in an area over several decades, each would result in a new stand. The *FEIS, Chapter 3*, *Vegetation Management*, (p. 3-152) discusses age-class distribution. Age-class distributions are discusses again in the cumulative effects section at page 3-157 and 3-158.

Chapter 3, Silviculture, pp. 3-157 and 3-158, provides a generalized discussion of the rotation through suitable timberlands in the analysis area by decade, beginning with the 1940s, when the first significant harvesting began.

Comment 3.9 *To meaningfully address the significant issue of impacts due to new road construction, the Forest Service must consider an action alternative which requires no new road construction. In this way, the Forest Service can evaluate an alternative which responds to the Purpose and Need of the EIS while eliminating any impacts due to road construction.*

Response 3.9 The Forest Service is not required by law to analyze a "no new roads" action alternative. See *FEIS, Chapter 2, Alternatives Eliminated From Detailed Consideration, No helicopter harvesting, fewer roads, and harvesting only high value timber units,* pp. 2-4 to 2-5.

Comment 3.10 *In assessing the impact of new road construction, the agency must disclose all information regarding the status of the road system in the entire Thorne Bay Ranger District. According to the FY 1999 Annual Monitoring and Evaluation Report for the Tongass, roads across the Tongass are causing significant problems for fish passage.[5] Over half of salmon stream crossings and over three-quarters of trout stream crossings which had culverts failed to meet standards for passing juvenile fish.[6] These failures violate NFMA regulations that prohibit any "management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment… which seriously and adversely affect water conditions or fish habitat." 36 C.F.R. § 219.27(e). We understand that more detailed information has been gathered in the course of road condition surveys performed on the Thorne Bay Ranger District. The agency should include a summary of all relevant road condition surveys done on the District, including specific information regarding the status of the road system on Tuxekan Island. This information will allow the public and decision-makers the opportunity to more fully understand and evaluate the impacts of new road construction in this Project Area.*

[5] *See USFS, Tongass National Forest Annual Monitoring and Evaluation Report for FY99 at 29.*

[6] *Id.*

Response 3.10 The most up to date road condition surveys available have been used to determine road maintenance needs for the project. Disclosing the status of the road system for the entire Thorne Bay Ranger District is not required and is outside the scope of this project.

Comment 3.11 *Tuxekan Island serves as an important migration corridor for land mammals traveling between Prince of Wales Island and the scattered islands of Sea Otter Sound. The island has historically provided important habitat for deer and the northern portion of the island still contains highly productive deer habitat. In considering this timber sale, the agency must evaluate the adequacy of the island's old-growth reserves. Some of the factors which the agency must consider include:"[i]mportant deer winter range to maintain important deer habitat capability to meet public demand for use of the deer resource," and "landscape linkages between larger re-serves." Forest Plan at K-1 to K-2.*

Response 3.11 These factors were considered during Interagency Committee meetings to review small OGRs and to develop the Interagency Committee recommendation for small OGRs. The Interagency Committee recommendation was incorporated into Alternatives 4 and 5. In addition, Alternative 2 incorporates the recommended OGRs with only minor modifications. For more information see the *FEIS*, *Chapter 3, Issue 3a, Habitat Connectivity*, pp. 3-87 through 3-97.

The Forest Plan does not require maintenance of landscape connectivity between small OGRs, but because of extensive past harvesting on the island (including some in riparian areas and beach buffer, connectivity was incorporated into developing the alternatives, and is addressed in the analysis.

Comment 3.12 *In particular, the northwest corner of the island is perhaps the best deer habitat left on the island. Yet it is not spared in the Forest Service's preferred alternative. Wolves use the island to escape the pressures they face on nearby Prince of Wales Island, pressures brought to bear primarily by the presence of an extensive road system. Tuxekan also supports a vibrant bear population, a distinction that may well disappear if logging and road-building continues as proposed in the agency's preferred alternative. Indeed, the continued fragmentation of habitat is a direct consequence of the agency's insistence on continuing to promote logging in sensitive areas.*

Response 3.12 The extreme northwest corner of the island was identified as an unroaded area and has not been previously harvested. All action alternatives do include one CCR unit (556-409) in this area, along with a temporary road to access it. Effects of entry into this area are addressed in the analysis for wolves. Effects of the alternatives on the other species are addressed as well.

Comment 3.12a *In order to best serve the subsistence, tourism, and recreation needs of the greater public, the agency must address the reality of the dire economic demand forecast for Tongass timber, and work to support other economies and uses that are increasingly important to a growing segment of the population both in Southeast Alaska and the nation as whole.*

Response 3.12a The analysis of the market demand for Tongass timber is addressed in the 2005 Market Demand Analysis and in Appendix A of the Final Environmental Impact Statement. Support for other economic sectors is beyond the scope of this project

Gabriel Scott

Comment 4.1 *Please consider the following comments of Cascadia Wildlands Project, and myself as an individual, regarding the Tuxekan Island Timber Sale(s) Draft Environmental Impact Statement (DEIS), released in December, 2004.*

Our basic interest here is conserving what little old growth forest remains. Old growth forest proposed for harvest currently has value in terms of wildlife, fish, recreation, subsistence, and quality of life.

We support Alternative A, No Action, with the caveat that road obliteration and maintenance still be done. The DEIS is clearly inadequate under NEPA, and fails to implement the Forest Plan.

Response 4.1 Comment Noted

Comment 4.2 ***Purpose & Need***

There is no need for the proposed action. The days of heavily-subsidized old-growth logging are numbered. The sooner the Forest Service stops planning old-growth logging and roadbuilding, the better.

Response 4.2 See *FEIS, Chapter 1, Purpose & Need*, pp. 1-15 to 1-16.

Comment 4.3 *The overall quality of the DEIS is disappointing. The scoping period on which this DEIS is based was done nearly five years ago, April 3 to May 31, 2000. The DEIS was apparently written several years ago. On our copy the date on the cover, December 2004, is posted on top of the original text, January 2003. The text is riddled with forward-looking statements about dates long past. For example, "Harvest of the existing State timber sale is expected to be completed in 2002." (DEIS, p.3-90) Why the long delay?*

Response 4.3 The delay in the process was caused by a loss of the original contractor and subsequent lack of District personnel to finish the project by the original projected completion date. The FEIS has been reworked to take into consideration comments received during the 45-day comment period and additional field checking.

Comment 4.4 *Thank you for adding the maps and extending the comment period. Maps in the unit and road cards was a vast improvement. However, it is mystifying how they could have been missed in the first place. Furthermore, the new maps still contain basic mistakes, for example, the "harvest acres" on each map is state as 38. It is difficult to have a very high degree of confidence in the DEIS when such basic mistakes are so common.*

Response 4.4 Please note that the accompanying unit cards have been updated.

Comment 4.5 *The several-year pause at the printer means much of the fieldwork is dated. Survey and analysis tools, for example the deer model, have improved in the intervening years. Other information, in particular Road Condition Surveys, is dated because the situation on the ground has doubtlessly changed over the last several years.*

Response 4.5 The most recent road conditions surveys available for Tuxekan Island have been used to determine road maintenance needs for the project. These road condition surveys have been updated to include maintenance work done by the District between the DEIS and FEIS.

Other surveys and updates have been included as well. This includes goshawk surveys in summer of 2005 and additional deer model runs.

Comment 4.6 *Other information in the EIS (see, for example, Appendix D) are specimens of perfect bureaucratic unintelligibility. This is better post-modern art, than forestry.*

Response 4.6 Appendix D has been reworked.

Comment 4.6a *We are most concerned about the negative cumulative effects of the proposed action, combined with past, present, and future logging in this neck of the woods. The cumulative effects analysis in the DEIS is entirely inadequate, and should be re-done.*

Response 4.6a See *FEIS, Chapter 3*.

Comment 4.6b *First, please consider Prince of Wales Island and other adjacent islands in terms of cumulative effects. Tuxekan Narrows is narrow. Tuxekan island is not isolated, but one of thousands in the immediate area. When it comes to analysis of economics, the DEIS admits, "the scope of the economic and social analysis for the Tuxekan Project needs to be broader than the project area because livelihoods depend on a broader base of resources." (DEIS, p.3-103) Humans are not unique in this regard. A wolf wouldn't look at this island in a vaccum, and neither should we. VCU 5570 encompasses the adjacent shoreline of Prince of Wales Island, yet the DEIS refuses to consider even the cumulative effects of past and future management there.*

Response 4.6b The FEIS has been updated to include the most recent past activities in the project area. The cumulative effects area for the socioeconomic analysis is Southeast Alaska *(FEIS, Chapter 3, Socioeconomics*, pp 3-252 to 3-263). The cumulative effects analysis area for wolves includes all of Tuxekan Island, as well as part of POW Island (*FEIS, Chapter 3, Wildlife Resources, Alexander Archipelago Wolf*, pp. 3-183 to 3-187).

Comment 4.7 *The EIS should consider the state timber sales (West Yatuk, North Yatuk, and 2058) scheduled for cutting about 2 mmbf each of the next three years in Naukati Bay, on Prince of Wales Island. (2005-2009 Southern Southeast Area 5-year schedule of Timber Sales) Cutting on state land is done under more lax environmental regulations than on Forest Service land. Beach buffers are only 300 feet, for example, and there aren't the same requirements about windfirm areas or karsts. Also consider that much of this state land is proposed to be given to the University, which would likely bring an even more intensive harvest.*

Response 4.7 See individual resource cumulative effects discussions for the spatial and temporal boundaries used for analysis. The commenter provides no link between the effects on Prince of Wales Island and Tuxekan Island with regard to the potential for cumulative effects to the timber resource or silvicultural methods or results.

Comment 4.8 *Second, please consider impacts of the LTF, camp and other infrastructure that necessarily will support the proposed action. Increased hunting, fishing and trapping pressure, for example, will be a direct consequence of selling this timber sale. Increased use of the LTF is integral to the sale. These trees will not just evaporate into thin air. Real people and real machines will do the work, and that will have real impacts. NEPA requires these impacts be considered.*

Response 4.8 For information regarding the Marine Access Facility (MAF) (previously know as Log Transfer Facility or LTF) and effects of its use use, see: *Tuxekan Island Timber Sales Logging and Transportation Plan* dated 7/9/2001 and *FEIS, Chapter 3: Transportation, Marine Access Facility*, p.3-125; *Wildlife: Humpback Whale Direct / Indirect Effects*, p. 3-162, *Steller Sea Lion Direct / Indirect Effects*, p. 162, *Alexander Archipelago Wolf Cumulative Effects*, pp. 3-186 & 3-187, *Bald Eagle Direct / Indirect Effects*, p. 3-190 & 3-191; *Fisheries: Fisheries Mitigation Measures*, p. 3-208, *Fisheries Cumulative Effects*, p. 3-212, *Essential Fish Habitat Assessment, Marine Water*, p. 3-217; *Recreation, Access Direct / Indirect Effects Common to Alternatives 2, 3, 4 and 5*, p. 3-238 & 3-239.

Comment 4.9 *Third, please consider the cumulative effects in time. Particularly, the cumulative effects of roads slated for opening, closing, construction and destruction, at different times, in a way such that the whole is more than the sum of its parts. For example, many of the roads you are putting into storage are undriveable now. The proposed action would open them first, in order to close them in a way that will require more substantive reconstruction down the line. Cumulative effects analysis would expose these effects, that are lost in the DEIS approach.*

Response 4.9 See *FEIS, Chapter 3, Transportation Management*, pp. 3-122 to 3-137.

Comment 4.10 *Fourth, the cumulative harvest of RMAs, beach buffers, and other areas specified for protection in the Forest Plan is cause for concern. Four watersheds have been mostly clearcut, often without benefit of protection for karst and watershed values. The proposed action will add to these problems, even while the same "reserve" areas are assumed to compensate for lost habitat values. This reliance makes it all the more important the cumulative effects of past harvest on reserve areas be considered.*

Response 4.10 No additional RMA, beach buffers, or other areas specified for protection in the 1997 Forest Plan would be harvested with any of the proposed action alternatives developed for the Tuxekan Project. All action alternatives would raise RMA disturbance with road construction. Alternative 2 and 4 would disturb approximately 1.0 acres in RMAs, Alternative 3 would disturb approximately 1.3 acres, and Alternative 5 would disturb approximately 0.9 acres. This would raise existing RMA disturbance from 22.5% to 22.6 %, a minor increase.

See *FEIS, Chapter 3: Wetlands Cumulative Effects, Riparian Management Area/Stream Channel Cumulative Effects, Water Yield Cumulative Effects, the Sediment Yield Cumulative Effects, and Water Quality and Sediment Cumulative Effects*; and *Karst Resources*. These sections discuss how the proposed action and Alternatives 3-5 would affect the project area, taking into account past and proposed activity.

Comment 4.11 *In place of discussing and disclosing impacts, the DEIS generally focuses instead on listing mitigation measures. Certainly, it doesn't hurt to disclose and discuss useful mitigation, but it shouldn't be done to obscure and avoid disclosure of actual impacts. For example, "Stream Buffers" is not an "Environmental Consequence." (see DEIS, p.3-155) The consequence is that riparian areas will be logged, and others exposed to edge effects and potential windthrow. That certain riparian areas will not be logged is not a consequence of those that are. Stream buffers are forested under all alternatives, including "no action." It is not correct to attribute saving them to selection of one of the action alternatives. They get less, not more, safe under the action alternatives.*

Response 4.11 Chapter 3 includes discussion on effects and mitigation beyond Forest Plan Standards and Guidelines by resource area.

Comment 4.12 *Past failure of mitigation measures is not "beyond the scope of this analysis." (DEIS, 1-17) Adaptive management isn't possible if failures aren't recognized and managed. Expecting 100% compliance may work on paper, but only there.*

Response 4.12 Agreed; this statement has been deleted from the document.

Comment 4.13 *Even if the Forest Plan automatically limited effects to "acceptable" levels, that would not obviate the Forest Service responsibility to disclose and consider those effects. How else can decision-makers establish which levels are "acceptable," except by evaluating what they are? The DEIS seems more concerned with establishing that the proposal would be legal, than with disclosing and considering impacts.*

Response 4.13 See *FEIS, Chapter 3*, individual resource analyses.

Comment 4.14 *This whole business of "deferred" and "reserved" portions of units stinks. The DEIS uses a convoluted logic to call clearcuts partial cuts, in order to meet Forest Plan Standards and Guidelines for marten and goshawks. The DEIS says "all proposed harvest units in the Tuxekan Project include an equal number of acres to be harvested and acres that will be deferred or reserved from harvest, therefore meeting the marten and goshawk requirements using the 1 to 1 factor for stand retention." (DEIS, p.3-139) This statement obscures quite a bit of trickery.*

By this logic, unit boundaries could always be moved to comply with the regulation, making a clearcut into a partial cut. The exact same cutting unit could be defined at 10% or 90% just by moving lines on a map. While moderately clever, the trick gives an untruthful impression, and more importantly, doesn't preserve adequate forest structure to assure viability of wildlife.

Response 4.14 The alternative development process is explained in Appendix G. The original unit pool was based taken from an island-wide logging system and transportation analysis. The reserve/deferred areas of the CCR units were originally part of these LSTA units, which Those LSTA units are the basis from which reserves and deferrals are applied in arriving at a final CCR unit using the 1 to 1 ratio allowed in the Forest Plan. Once delineated, the LSTA units do not change. They are the basis from which all unit configurations are made.

The effects of clearcutting with adjacent reserves or deferred areas, along with the rationale for doing so, are disclosed in the FEIS.

Comment 4.15 *Many of the "units" in the DEIS aren't really units. According to the unit cards, each "unit" is composed of several, smaller units--some marked to cut, others for "reserve." Typically, a unit in the DEIS is actually one cutting unit, plus a conglomeration of other units around nearby forest that is roughly equal in acreage to the amount proposed for cut. The reserved portions of units will be entirely different stands from cut units.*

Response 4.15 This is true, portions of units are reserved to meet requirements for certain resource protections such as fish streams, soils and karst. These retention areas are mapped and would be tracked. These units are removed from the suitable timber lands category, and would not be relied on in the future for timber production. Other portions of units are *deferred* from harvesting at this time, to meet requirements for marten and goshawk habitat. These areas remain in the suitable (timber) land base and would be included in long-term timber management plans. These areas are also mapped and tracked separately.

Comment 4.16 *Reserve areas often are not even contiguous to proposed clearcuts. For example, units 587.2-419 and 587.2-413 contain "reserves" that are not even adjacent to proposed clearcuts.*

Response 4.16 Adjacency is not required in the establishment of reserves or deferrals. As planning proceeds from the original “LSTA” proposed unit, to the final proposed unit, reserves and deferrals are applied, according to the design features of the alternatives, the application of standards and guides and the discovery during field reviews of areas in need of protection. What remains is the available harvest unit. The arrangement of deferrals, reserves and harvest area may appear to be disjunctive, but that is the product of sale unit design under the current forest plan.

Comment 4.17 *The DEIS claims that mitigation measures under the proposed action “include the establishment of riparian buffers.” (DEIS, p. 3-225) This is a false claim, because the decision to buffer those areas was made by Congress in 1990, and strengthened by the Forest Plan in 1997. They are protected in exactly the same way under all alternatives, including "no action." It isn’t accurate to claim this land is spared from harvest every few years.*

Response 4.17 The Forest Plan recommends buffer widths however all streams are not protected in exactly the same way. Wind firmness of buffers was a foremost consideration for each unit and many of the perennial water courses (class I, II and III streams) have buffers 300’ or greater and/or are feathered to prevent wind throw. Additional buffer widths were also created for areas that possessed sensitive soils. Many of the buffer widths are three times greater than the current buffer widths recommended in the Forest Plan. These buffer widths comply with the Alaska Forest Resources and Practices Act of 1979 (as amended) Standards and Guidelines for timber harvesting and processing.

Comment 4.18 *What is the practical impact of the decision to defer or reserve areas? What do you mean that, "When harvest units are deferred or reserved, the potential for unforeseen adverse impacts from disturbance is reduced?" (DEIS, p.3-99) As most of these reserves aren't available for logging or roadbuilding anyway, it isn't clear what adverse impacts might be prevented.*

Response 4.18 The statement of page 3-99 is a general recognition that a secondary effect of the application of reserves and deferrals is simply that fewer acres are available for harvest, and therefore fewer acres are exposed to adverse impacts of any sort.

Comment 4.19 *The DEIS mistakenly counts stream and karst buffers, high vulnerability karst, and the beach fringe as contributing to stand structure to meet the marten and goshawk S&Gs. However, the Clarification paper on the marten and goshawk S&Gs, Clarification A, areas Not Contributing to Marten and Goshawk S&Gs Forest Structure Requirements Within Timber Harvest Units, lists,*

> *"1. 1,000 foot beach fringe buffer.*
>
> *2. Minimum no harvest buffers as required by Forest Plan Riparian S&Gs on streams outside of or adjacent to timber harvest units.*
>
> *3. Non-development Land Use Designations (Old-Growth, Semi-remote Recreation, Research Natural Areas, etc.) that may occur adjacent to timber harvest units."*

Furthermore, many "reserve" areas are not, in fact, being reserved. Many units, including 556-409, 556-412, 557-402, 557-403, 560-401, 560-402, 560-403, 560-404, 560-405, 560-408, 560-411, 560-416, 587.2-414, 587.2-419, and 587.2-424, propose road construction or re-construction within areas marked for "reserve." Obviously, road construction will preclude these "reserves" having any long-term habitat value for marten or goshawks.

The DEIS also fails to consider whether these reserve areas are even forested. A muskeg next to a clearcut has no special value to marten or goshawks. Yet, the DEIS appears to count these areas as contributors to canopy cover.

Response 4.19 Additional analysis has shown that the reserve/deferred areas are largely composed of high volume strata (more than 86%) while the remainder is largely low or moderate volume productive old growth.

Additional analysis has been incorporated to address the effects of road construction in "reserved" areas. It is recognized that road corridors through reserve or deferred areas would not contribute to meeting the goshawk and marten standards and guidelines. Because of the small acreage involved, this would be addressed during unit layout and is shown on the unit cards where appropriate.

Comment 4.20 *Karst landscapes are valuable. The DEIS fails to recognize this. Please thoroughly consider impacts to karst.*

Response 4.20 The karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. See the *FEIS, Chapter 3, Karst*, pp. 3-45 to 3-65.

See *FEIS*, *Chapter 1, Project Background,* pp. 1-5 to 1-7, for a discussion of road relocations to eliminate karst concerns for road construction.

Comment 4.21 *Fish are bigger and more plentiful in karst-influenced terrain due to synergistic effects of karst, trees, soil, water, and fish. (Bryant et al., 1998; Baichtal & Swanston, 1996). Caves are valuable denning sites for river otter, deer, bear, wolf and small fur bearers, roosting and hibernating habitat for bats. (Baichtal & Swanston, 1996)*

> *The functions and biological significance of the karst landscape are only just beginning to be understood. Preliminary investigations suggest an increased productivity for plant, animal and aquatic communities…Some of the most productive western hemlock-Sitka spruce forests exist on top of karst…The waters issuing from subsurface karst drainage systems are 8 to 10 times more productive for associated aquatic communities." (Baichtal, 1996, p.10)*

Karst also contributes to forest productivity.

> *Trees growing on karst generally have roots extending into dissolved cracks in the bedrock. These roots translocate water and nutrients back up into the forest canopy. Much of the site productivity is tied up in this nutrient cycle and in the forest canopy; when trees are harvested, the cycle is disrupted…Karst systems are productive, but fragile." (Baichtal & Swanston, 1996, p.9)*

Response 4.21 We concur with the quoted references in this comment.

Comment 4.22 *It is imperative that you consider the interrelation between karst, soils, streams, aquatic ecosystems and fish. Karst contributes to productivity of aquatic ecosystems. Logging and roadbuilding will have significant impacts to karsts, causing negative impacts to fish. Loss of fish means lost nutrients for soil productivity and lost food for wildlife. The dirt, water, plants and critters are all physically linked together by karst. As we continue to interfere with this system we will screw it up*

Response 4.22 We acknowledge the inter-relationship between karst and other resources (*FEIS, Chapter 3, Issue 1 - Watershed Health and Karst System Protection (Soils*, *Hydrology*, *Karst):* pp.3-1 to 3-65; *Fisheries*, pp.-3-198 to 3-218).

The two main influences by karst on fisheries are water volume and water chemistry. Waters originating in one watershed can and do resurface in other watersheds providing additional flow volume. These waters have higher alkalinities that have been directly related to increased stream productivity, including increased densities of fish populations (Bryant et al, 1998). When flow volume is eliminated or changed due to slash or other debris clogging the karst system then discharge in other watersheds may be altered. Increases in organic matter produce increases in oxygen consumption, altering existing oxygen levels (MacDonald, et al 1991).

However, other factors also influence salmonids productivity and densities such as well developed gravel substrates, large woody debris and complex pools. Mitigation measures prescribed for riparian areas, including buffers

would minimize any affects on these habitat factors. Mitigations for eliminating or reducing impacts to the karst resource are summarized under Mitigation Measures, FEIS.

For additional comments/responses on soils, see Responses to Comments 7.1-7.5.

Comment 4.23 *Action alternatives would have unacceptable impacts to karsts*

We strongly disagree with the conclusion, "By excluding high vulnerability karst lands and surface waters flowing into karst features the overall karst system should, for all practical purposes, remain in a natural state." (DEIS, p.3-91) This is an excellent example of where the Forest Plan is blindly relied on to mitigate impacts

Response 4.23 We appreciate your noting a sentence and conclusion both of which need clarification.

The karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. See the *FEIS, Chapter 3, Karst*, pp. 3-45 through 3-65

Comment 4.24 *The proposed action appears to violate the Forest Plan Standards & Guidelines for logging and roadbuilding on high vulnerability karst, and moderate/high vulnerability edges. At least 116 acres of high vulnerability karst will have 0.29 miles of road and six logging units on or adjacent to them.*

Response 4.24 The karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. See the *FEIS, Chapter 3, Karst*, pp. 3-45 through 3-65

Standards and guidelines for moderate/high vulnerability edges have been applied as required by Forest Plan, Appendix I4b. Mitigation is applied as required in the FEIS, under Mitigation Measures.

All areas of high vulnerability karst within the proposed units have been dropped and no roads are proposed across high vulnerability karst (*FEIS, Chapter 1, Project Background*, pp. 1-5 & 1-6).

See *FEIS*, *Chapter 1, Project Background, Additional*, 1-5 & 1-6 for a discussion of road relocations to eliminate karst concerns for road construction.

Comment 4.25 *The decision seems to have been made that it would be more "cost efficient" to allow roadbuilding over high vulnerability karst. (DEIS, 2-37) That is not a good enough reason, and the DEIS offers no support for it.*

Logging, road building and other road maintenance are likely to have significant impacts to karst in the project area. Cumulative effects in particular are extreme. The DEIS states dryly, "Any surface management activity on a karst landscape is likely to affect the components of that landscape to some extent….Surface landforms and surface hydrology would most obviously be affected; however, because of the direct link between surface water and subsurface drainage, karst hydrologic systems can also be affected." (DEIS, 3-83)

Response 4.25 See Response 4.24.

Comment 4.25a *Medium-vulnerability areas, by definition, pose a "threat for organic materials, sediment, or debris introduction into the karst hydrologic systems beneath the surface." (DEIS, 3-80)*

Response 4.25a The quote of the DEIS, is incomplete and does not represent the definition.

The full quote from the DEIS, pg 3-80 states: "Moderate vulnerability karst poses a limited threat for organic materials, sediment, or debris introduction into the karst hydrologic systems beneath the surface". This full quote is in accordance with the Forest Plan and the Soils, Geology, Mineral and Wetlands Resources Report by URS (2001). Please refer to section Known Karst Resources within the Project Area, FEIS for the full version of the definition of moderate vulnerability karst, as there are many components to the definition. However, as stated under Mitigation Measures section of the FEIS Standards and guidelines and BMPs have been deemed effective at preventing or limiting any potential effects to acceptable levels.

See Response 4.24.

Comment 4.26 *We are greatly concerned that impacts to the watersheds of concern (affectionately labeled watersheds 3, 4, and 5) will be severe. The conclusion t hat "significant direct and indirect environmental effects are not expected within the watersheds of concern," is baseless. (DEIS, p.3-98)*

Proposed logging will clearly disrupt the water balance of these watersheds over the long term, first by introducing a strong pulse of high peak flows, sediment and debris, then by greatly diminishing water yield as canopy cover reaches 100%. Without a scientific basis for it, the DEIS seems to sort of balance the two, for example with the statement, "increased yield from open roads would be masked by decreased yield in harvested areas after 4 to 5 years." (DEIS, p.3-86)

What are the impacts of the reduced long-term water yield across the project area? Especially in terms of cumulative effects, at the end of the 100-year rotation a huge percentage of the landcover will have greatly diminished water yield

Response 4.26 For timber harvest, the Forest Plan suggests a threshold of concern when a watershed exceeds 20 percent of its area in second growth forests younger than 30 years (USDA-FS 1997a, Appendix J). This suggests that both water and sediment yield effects from timber harvesting last well beyond 4-5 years.

Currently, 4 of 21 project area watersheds are above this 20% threshold of concern. Implementation of the Tuxekan Project will not increase this number. After anticipated project completion in 2012, no watersheds will be above the threshold of concern due to vegetation in growth and stand maturation.

Increases in water yield can trigger increases in sediment yield, but this is not anticipated with this project.

Refer to the *FEIS, Chapter 3, Hydrology Water Yield and Sediment Yield* sections (pp. 3-35 to 3-45) for further information.

Comment 4.27 *It isn't clear how catchment area management is incorporated into watershed management. (Forest Plan p.I-16) A map would help a lot.*

Response 4.27 A project area watershed map has been provided (see *FEIS, Chapter 3, Hydrology, Figure 3-3*. p. 3-17)

Per Forest Plan Standards and Guidelines, a watershed assessment and a karst landscape inventory were conducted. Mapping of karst features and a dye study were completed in order to define the karst hydrologic system and watershed catchment areas for the Tuxekan Project Area. The watershed assessment and karst inventory reports are located within the project file.

For an explanation on how project area watersheds were delineated taking into account karst features, refer to the *FEIS, Chapter 3, Hydrology, Data Collection Methods; Watershed Delineation*, pp. 3-20 through 3-21.

Other information on karst can be found in the *FEIS, Chapter 3, Karst, Affected Environment*, *Karst Affected Environment,* pp. 3-47 to 3-61.

Comment 4.28 *There are substantial gaps in available knowledge about karsts. Survey and karst-identification methods are imperfect and rapidly evolving. The ecological role of karsts, and recognition that logging and roadbuilding on karst-lands impairs their productivity, sometimes severely, is new and evolving. We do not see the scientific support for the conclusions in the DEIS.*

> *"Quantitative information on the effects of forest management on karst landscapes in southeast Alaska is limited. In particular, it is not known what cumulative effects past timber harvest has had on the epikarst landscape. Hydrologic models currently used for estimating cumulative effect of proposed surface management activities are not designed to model effects of timber harvest on karst lands." (Baichtal & Swanston, 1996, p.9)*

Response 4.28 The comment is noted regarding logging, road building, and karst productivity and ecosystems. The karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. See the *FEIS, Chapter 3, Karst*, pp. 3-45 through 3-65.

Cascadia Wildlands is correct in referencing Baichtal and Swanston in noting that currently used hydrologic models are not designed to account for the impacts of surface activities on karst. These models are not used because they would not accurately assess potential outcomes or effects due to the complex inter-relationship between surface and subsurface processes and the lack of research on this topic that would take decades of intense research to develop such a model.

As a result, other metrics have been used to assess the potential impacts to karst resources *(FEIS: Chapter 1, Issue 1 - Watershed Health and Karst System Protection, Table 1-5, Karst*, p. 1-21; *Chapter 2, Comparison of Alternatives by Significant Issue, Table 2-3, Karst,* p. 2-34; *Chapter 3, Karst*, pp. 3-45 through 3-65).

As a legitimate quantitative model is not available the potential for cumulative effects was assessed using acres of past harvest, the cumulative percent of carbonate harvested, existing road miles located on carbonate,

road miles on carbonate to be reconstructed, proposed new road miles on carbonate, cumulative percent increase of road on carbonate.

Please refer to *FEIS, Chapter 3, Karst*: *Water Quantity Cumulative Effects*, pp. 3-62 & 3-63 and *Water Quality and Sediment Cumulative Effects*, pp. 3-64 & 3-65, for a discussion of the data analysis and interpretation.

Comment 4.29 *The fact that the watershed boundaries in the Forest Plan needed adjusting is an illustration of why project-level analysis of impacts is important. (3-79)*

Response 4.29 Per Forest Plan Standards and Guidelines, a watershed assessment and a karst landscape inventory were conducted. Mapping of karst features and a dye study were completed in order to define the karst hydrologic system and watershed catchment areas for the Tuxekan Project Area. The watershed assessment and karst inventory reports are located within the project file.

See Response 4.27.

Comment 4.30 *Please be more explicit about the basis for identification of karst vulnerability rankings, particularly since these categories are the key mitigation proposed. The maps and unit cards raise pressing questions. For example, slopes over 72% and upstream of salmon streams are apparently considered "moderate vulnerability" karst, in violation of the Forest Plan standards.*

We are concerned that karst features have not been adequately identified. The DEIS appears to rely exclusively on interpretation of aerial photographs and LIDAR to make critical determinations.

We are concerned that

> *"…it is assumed that increased flows resulting from harvest activities commonly extend over a 4 to 5 year period after harvest. Conservatively, the water balance is assumed to be fully restored to preharvest conditions approximately 30 years after harvest." (DEIS, p.3-84)*

There is no reason why you should have to rely on a 1979 study from the Pacific Northwest to anticipate vegetation re-growth after harvest. With your considerable experience cutting trees here, surely more specific information is available. The more northerly latitude generally suggests re-growth would be slower at Tuxekan, as compared with the PNW.

Response 4.30 For timber harvest, the Forest Plan suggests a threshold of concern when a watershed exceeds 20 percent of its area in second growth forests younger than 30 years (USDA-FS 1997a, Appendix J). This is the basis for the Tuxekan project water yield analysis. The 20% harvesting value in 30- years suggests that both water and sediment yield effects from timber harvesting last well beyond 4-5 years. Please refer to *FEIS, Chapter 3, Hydrology, Water Yield*, pp.3-34 through 3-37 for further information.

The basis for karst vulnerability ratings are discussed in additional detail under *FEIS, Chapter 3, Karst, Known Karst Resources within the Project Area*, pp.3-45 through 3-65. The vulnerability ratings for karst areas associated with proposed timber harvesting units were based on a classification system derived from the management strategies originally developed by Aley et al (1993), USDA Forest Service's draft 1994 of Karst and Cave Standards and Guidelines, and the 1999 draft Tongass clarification paper for karst and cave resources dated. Vulnerability

ratings were determined by URS in 2001 as well by the Forest Service in 2005 (Baichtal, 2005a-c, North, 2005a-g, Fryxell, 2005a and b).

Aerial photographs and LIDAR were only used to help assess areas for potential karst features (Methods of Analysis Section, FEIS). Features were identified by URS 2001 and additional features were documented in 2001 (Baichtal, 2005a-c, North, 2005a-g, Fryxell, 2005a and b).

We appreciate the sharp eye of the commenter. However, the 72% slope requirement found under the 1997 Appendix I, Karst and Caves Standards and Guidelines, was modified in 1999 by the draft Tongass National Forest Land and Resource Plan Implementation Policy Clarification Karst Management Standards and Guidelines Paper. The paper clarifies the direction that the discussion of harvesting on slopes greater than 72% has been removed as a characteristic used to define levels of karst vulnerability. For a discussion of how impacts to karst relates to fisheries, please see comment 4.22.

This approach was applied in the Madan and Licking Creek timber sales. The 72% slope criterion is in fact related to soils productivity issues and not to karst. As a result, these units were not in violation of moderate vulnerability karst standards and guidelines.

The higher alkalinities observed in karst-influenced streams have a positive effect on aquatic productivity.

The discussion regarding water yield increases in a 4-5 year post-harvesting time frame has been deleted from the FEIS. The reduction in canopy cover and increases in non-permeable surfaces does result in a reduction of the amount of transpiration and interception that occurs in a forest. The relationship between vegetation removal and water yield increases are established in the literature. As result, Appendix J of Forest Plan establishes a guideline that watersheds should be tracked where any harvesting is equal to or less than 30 years in age (1976-2006 for this study) to compare threshold conditions for water yield. The 30-year theory is still under scrutiny since past studies have indicated a variety of responses. However, as stated above literature supports a relationship between harvesting and water yield increases.

Please refer to *FEIS, Chapter 3, Hydrology, Water Yield: Affected Environment, Direct/Indirect Effects, and Cumulative Effects*, pp.3-45 to 3-65 for a complete discussion of project implications.

Although Keppler and Ziemer, 1990, discuss the evidence for a 30 year recovery for water yield they do not discuss growth rates. Studies specific to Southeast Alaska on karst are unavailable at this time. However, Banner et al 2005 document that in their “Hyt3 project” regrowth rates on karst, in coastal British Columbia, are largely unknown. However, they speculate that the well drained conditions found on karst may actually improve growth.

Comment 4.31 *It is not correct that “sediment transport is directly correlated to the 4 to 5 year water yield scenario,” for harvest units. Tree roots die after about that time, creating another round of increased sediment when slopes fail.*

Response 4.31 For timber harvest, the Forest Plan suggests a threshold of concern when a watershed exceeds 20 percent of its area in second growth forests younger than 30 years (USDA-FS 1997a, Appendix J). This suggests that both water and sediment yield effects from timber harvesting last well beyond 4-5 years. Please refer to the Hydrology Water Yield and Sediment Yield sections for further information.

Comment 4.32 *Please further define the statement:*

> *"With the implementation of protective measures, minor amounts of sediment related to forest management activities that enter the karst system are not expected to significantly change the karst hydrologic regime." (DEIS, p.3-85)*

What does "minor" mean? How is this arrived at?

Response 4.32 The statement regarding "minor amounts of sediment" was deleted as the DEIS was edited to produce the FEIS. The karst resource was reanalyzed after the DEIS was released based on public comment and updated field information. The *FEIS, Chapter 3, Karst* (pp. 3-45 to 3-65) has been reanalyzed and considerable additional detail has been added for a thorough review and consideration of impacts to karst resources.

The largest existing and potential contributor of sediment within the project is, and would be from roads. However, the amount of sediment actually entering the karst system would be a function of the number of drainages actually entering into a karst opening with an underground connection. The 2005 Road Condition Survey did not define any locations where surface runoff from roads, or other related surface drainages were entering karst systems. The Direct/Indirect section of the hydrology section does project quantitatively derived amounts of sediment due to stream crossings. See *FEIS, Chapter 3: Hydrology, Water Yield* and *Sediment Yield,* pp. 3-35 to 3-45; *Karst*, pp. 3-45 to 3-65 For potential for sediment related impacts to surface and groundwater, and to the karst systems.

Comment 4.33 *There is no assurance of windfirm buffers, and many units seem to preclude windfirm buffers around karst. Please explain the contradictory positions that windthrow is anticipated, but that action alternatives pose no threat to significant karst lands due to "windfirm buffers and reserve areas." It is never explained what is meant by "windfirm," while unit cards and past experience clearly show that windthrow risk is uniformly very high as a result of cutting. Windthrow risk for units varies from high to extreme. (DEIS, p.3- This great number of small units is creating lots of forest edge, lots of which is going to blow down. Declaring buffers windfirm will not make it so. Meanwhile, these unrealistic expectations for retention of buffers are being relied on to a huge extent to protect biodiversity and watersheds.*

Response 4.33

The respondent is correct in noting the presence of these contradictory statements within the DEIS. They have been clarified Windfirmness is defined as the ability of a stand to withstand wind and not have trees topple over during periods of high winds that are often associated with the winter storms of Southeast Alaska.

Stands in Southeast Alaska depend on their roots being interconnected. When openings in the stand are created by harvesting there is disruption to the root system and the stability of trees. The opening functions in effect as a place where the wind "trips" stumbling over trees and overturning them. Windthrow in Appendix I to the Forest Plan states: "When designing buffers to protect karst systems and their features, the buffer should be designed to be wind-firm. There is no credible standard buffer distance that would provide the assurance required to protect the systems from blowdown of the forest within a given buffer. Each buffer must be carefully designed considering wind direction patterns, blowdown history, previous adjacent harvest, topography, and stand windfirmness. Delineated lands surrounding such features and systems must be of sufficient size to insure protection even if blowdown occurs" (USDA FS 1997).

Buffers have been laid out according to Forest Plan Standards and Guidelines and additional guidelines in Appendix I of Forest Plan. The criteria stated in the Forest Plan were taken into consideration during layout. Buffer windfirmness and their effectiveness in protecting associated karst resources would be monitored annually as part of the Forest monitoring program and the information collected would be documented.

For individual discussions of windfirmness, see F*EIS, Chapter3*: pp. 3-60, 3-103, 3-140, 3-150, 3-166, 3-167, 3-179, 3-180, 3-192, 3-194, 3-197, 3-205, 3-208, 3-209, 3-210, 3-213, 3-214.

Comment 4.34

While much is made of buffers along streams and around karst features, in fact no such buffers exist over wide areas of the project area. A large percentage of the stream and karst buffers have already been logged. Action alternatives would clearcut several hundred acres and build several miles of road directly on vulnerable karst features.

Response 4.34

Past timber harvesting logged, on the average, 21% of Riparian Management Areas (RMAs) since the 1920s. Table 3-15 (*FEIS, Chapter 3, Hydrology, Past disturbance, Timber Harvesting*, p.3-25) also provides the amount of RMA harvested by watershed. Table 3-6 in this same section shows the acres lost to roading in RMAs, due to past harvest, by watershed. No harvesting is proposed within RMAs for any proposed action alternative. Road construction would result in 1.3 acres or less disturbance within the RMAs (RMAs Direct/Indirect Effects, FEIS).

Forest Plan Standards and Guidelines state that no harvesting would be occurring on high vulnerability karst. See *FEIS, Chapter 3, Hydrology, Data Collection Methods and Watershed Delineation*, pp. 3-20 hrough 3-21 for an explanation on how project area watersheds were delineated taking into account karst features.

Refer to response 4.10 also.

Comment 4.35 *What are the impacts of roads over the long term on water yield and sediment?*

Response 4.35 See *FEIS, Chapter 3: Hydrology, Water Yield*, and *Sediment Yield,* pp. 3-35 to 3-45; *Karst*, pp. 3-45 to 3-65 for discussion of impacts of roads over the long term on water and sediment yields.

Comment 4.36 *It is generally recognized that roads make land less productive. Particularly as pit-run shot rock is going to be used, what the regeneration expectations on roads?*

Response 4.36 Permanent roads are not expected to regenerate back to forestland or contribute to future timber outputs. Temporary roads are expected to be returned to timber production. Years of experience shows that temporary roads in fact do regenerate, often with spruce and cedar. While growth may be slower on these sites in the short term, the long-term effect is not known. A management decision to build, use and then close temporary roads recognizes this trade-off as a "cost" of managing timberlands.

Comment 4.37 *What are the impacts of roads in terms of altering surface hydrology?*

Response 4.37 Roads permanently alter surface hydrology by blocking and/or redirecting surface flow, increasing surface fines to streams, impacting water and sediment yield, and affecting riparian and karst areas. Impacts from roads on the hydrology resource are discussed in the *FEIS, Chapter 3*: *Soils* (pp.3-2 to 3-15); *Wetlands, Riparian Management Areas (RMAs)*, *Water Yield*, *Sediment Yield* (pp.3-28 to 3-45); and *Karst* (pp. 3-45 to 3-65).

Comment 4.38 *It would seem that potential impacts of increased water yield are in proportion to the maximum amount of exposed land and open road miles at the peak, not just over the long term. Therefore, please analyze impacts if roads are all open (41 miles being used, as opposed to 37 miles open and driveable now) and units all cut, as that would give a picture of the maximum storm event.*

Response 4.38 The water yield analysis in the FEIS takes into account all open roads, all decommissioned roads, all temporary and proposed roads for each action alternative as well as timber harvesting over the past 30 years.

Currently, there are 60.9 miles of existing open and decommissioned roads within the project area (See *FEIS, Chapter 3, Hydrology, Past Disturbance, Roads,* p. 3-26 & 3-27). Table 3-16 lists timber harvesting by watershed since the 1920s. This data was used in the Hydrology Water Yield section and the Karst Resources Water Quantity section.

Comment 4.39 *Closing roads does not do very much to diminish cumulative effects of roads on karst. The repeated disturbance of re-constructing and de-constructing roads in and out of storage introduces sediment, soils are buried, and hydrologic patterns are altered and set. These things are long-term. The karst beneath a road is not much better off for that segment being temporarily closed to traffic.*

Response 4.39 In southeast Alaska, road closure in itself, does not dramatically reduce the cumulative effects of roads on karst. Effects would be in place as long as the road prism is in place, regardless if it is decommissioned or in storage. Existing and decommissioned roads, located on high vulnerability karst prior to the 1997 Forest Plan Standards and Guidelines would continue to have the greatest contribution to cumulative effects. The magnitude of

those effects would be the result of a complex interaction between the vulnerability of the karst, how well the existing road is maintained and, for decommissioned roads, how well BMPs are fully implemented. Road closure BMPs are implemented with the specific intent or preventing culverts on closed roads from "blowing out' and creating larger overall problems.

However, from a cumulative standpoint, maintenance of open roads and closure following use lessens the magnitude effects of an individual road's contribution to cumulative effects as point source problems are resolved, lessening long-term additive contributions.

Under all action alternatives, roads have relocated to reduce the effects on karst (*FEIS, Chapter 1, Project Background*, pp. 5-7).

Comment 4.40 *Fish, particularly salmon, are a cornerstone of this ecosystem. The proposed action would have substantial negative impacts to fish that should be more carefully considered.*

Response 4.40 The Forest Service agrees that salmon are a cornerstone species of the Southeast Alaska ecosystem. However, significant direct and indirect effects to water quality, aquatic habitat, salmonid spawning gravel or populations of fish are not expected to result from implementation of the action alternatives associated with the Tuxekan timber sales. Approximately 1/4th acre of vegetation within the riparian management areas (RMA) would be disturbed or removed to construct a bridge over a Class I stream in watershed 18 (common to all action alternatives). Other than this disturbance, no timber harvesting would occur within RMA under any alternative. The cumulative effects to RMAs would be a minor 0.2 acre reduction in future sources of large woody debris (LWD). The reduction in potential LWD would be limited to the bridge construction site and have negligible effects on bank stability, stream shade, bank and channel stability.

Temporary road construction, road reconstruction, stream crossing construction, timber harvesting and haul would incrementally directly, indirectly and cumulatively increase fine sediment delivery to fish bearing streams and lakes. The majority of spawning habitat occurs within the low gradient reaches (<3% stream slope) of Class I-II streams, lake inlets and outlets. Sockeye spawning can also occur in lake gravels where sufficient substrate and up-welling are present. Pink salmon are also able to spawn in brackish water of intertidal influenced reaches associated with within the estuary.

Fine sediment generated from project activities of associated with the action alternatives could negatively impact sensitive spawning habitat. However stream buffers, application of wind firm buffers on specific units, avoidance of steep/unstable slopes and road construction and stream crossing mitigation measures are expected to minimize negative direct, indirect and cumulative effects to a point where impacts to spawning gravel and salmonid production would not be detectable relative to background conditions.

Comment 4.41 *What is the basis for the conclusion that "minimal effects to fisheries resources are anticipated?" (DEIS, p.3-156) On what scale are effects "minimal?"*

Response 4.41 Fine sediment generated from project activities of associated with the action alternatives could negatively affect sensitive spawning habitat and fish populations within the project area. However stream buffers, application of wind firm buffers on specific units, avoidance of steep/unstable slopes and road construction and stream crossing mitigation measures are expected to ***minimize*** negative direct, indirect and cumulative effects to a point where impacts to spawning gravel and salmonid production would not be detectable relative to background conditions.

Comment 4.42 *How is it that "Standards and Guidelines are sufficient to protect fish habitat and provide for sport and commercial fisheries and subsistence?" (DEIS, p.3-158) In the very next breath, the DEIS explains the results of a panel of fisheries biologists and hydrologists, "agreed that even with the highest level of riparian protection, the risk of impacts on fish could still be relatively high in heavily impacted watersheds due to cumulative effects." In face of this, the DEIS offers, lamely, "salmon catch and escapement numbers have been high in Southeast Alaska during the last decade." (DEIS, p.3-159)*

Response 4.42 The majority of productive, fish-bearing streams in the Tuxekan Project area are recovering from pre-1997 Forest Plan management practices that included road building on floodplains and alluvial fans; harvest and conversion of dominant riparian plant species; and the removal of in-stream LWD. Although there is a lack of systematic data available on salmonid populations pre- and post-logging in Alaska, Bryant and Everest, 1998 predicted that logged watersheds would be less resilient to environmental stresses than intact watersheds and that salmonid populations would therefore be more vulnerable to environmental disturbances such as decreased marine survival, drought, landslides, and flooding.

Many streams that contain fish habitat in areas of regeneration will lack potential LWD recruitment until streamside conifer trees in the RMAs become mature enough to provide new LWD to streams channels (URS Corporation 2002). In contrast, the areas with very little harvest in the floodplain provided recruitment of LWD maintaining channel complexity, creating fish rearing and macroinvertebrate habitat (URS Corporation 2002). If riparian areas are protected by no-cut and windfirm buffers, LWD recruitment should be regained over time and associated habitat restored.

Comment 4.43 *What is the impact of "alter[ing] the rate of contribution and loss of LWD?" (DEIS, p.3-156) Action alternatives will further decrease availability of LWD, diminishing the productivity of Tuxekan's aquatic environment.*

Response 4.43 See Response 4.42.

Comment 4.43a *Road construction, reconstruction, and storage will cause negative impacts to fish. The DEIS says that*

> *"road construction and use often pose the greatest potential risk to riparian resources and fish habitat capabilities….Roads can affect fish habitat through the introduction of fine sediment, increased landslide potential…and rerouting of sediment-laden water…Road construction also has the potential*

to affect upstream fish passage…Road culverts also have the potential to restrict LWD recruitment." (DEIS, p.3-157)

As explained below, under "Roads," the DEIS under-appreciates these effects. With regards to fish, it ignores the fact that even after roads are closed, crossings of fish streams impair habitat. Stream crossings over roads in storage have no overhanging banks or sidepools with clean substrate, which are preferred habitat for juvenile fish. (Bustard & Narver, 1975)

Response 4.43a See *FEIS, Chapter3, Fisheries*, pp. 3-198 to 3-218.

Comment 4.44 *The section on Essential Fish Habitat is confusing. Please do your consultation with NMFS, rather than trying to fold it in to an EIS. This section seems to contradict the previous section, "Environmental Effects," which said over and over that impacts to fish habitat wouldn't exist. Here, they "may adversely effect" essential fish habitat.*

Response 4.44 By implementing Forest Plan Standards and Guidelines and BMPs, direct, indirect, and cumulative effects of the proposed activities on EFH will be minimized. Without these protection measures, the Tuxekan Project may adverse effects EFH as a result of vegetation management activities, barging of logs, and associated temporary road building. This is now clarified in the *FEIS, Chapter3, Fisheries*, pp. 3-198 to 3-218.

Comment 4.45 *The DEIS takes inadequate notice of potential impacts to commercial fisheries. Specifying information about fish and fishing in the area is not "beyond the scope of this EIS." (DEIS, 1-17) That information is critical to reaching an informed decision. Please compile and consider it in the Final. Please thoroughly analyze and consider negative impacts to commercial fisheries, including cumulative effects.*

Response 4.45 Measurable direct, indirect or cumulative effects to water quality, aquatic habitat, salmonid spawning gravel or populations of fish are not expected to result from implementation of the action alternatives associated with the Tuxekan Project. Therefore, no impact to commercial catch is expected.

Comment 4.46 *How many fish does this island produce? How many of them are caught commercially, or for subsistence?*

Response 4.46 ADF&G Peak Salmon Escapement counts for Tuxekan Island streams, Peak and average Southeast Alaska commercial salmon and non-salmonid catches by species, ADF&G sport fish harvest figures for the vicinity of Prince Island and Southeast Alaska, and ADF&G commercial fish catches by species for the sub district in the vicinity of the project area are listed in the Fisheries Resource Report for Tuxekan Island Timber Sale. Information on subsistence is available in the Subsistence Fisheries section of the Fisheries Resource Report and the Final Subsistence Resource Report.

Comment 4.47 *How many fewer fish will there be as a result of the proposed action?*

Response 4.47 Stream buffers, application of wind firm buffers on specific units, avoidance of steep/unstable slopes and road construction and stream crossing mitigation measures are expected to minimize negative direct, indirect and cumulative effects to a point where changes (declines or increases) in populations of salmon and trout are not expected to occur.

Comment 4.48 *What are the important spawning habitats? Where do Karheen reds spawn*

Response 4.48 The majority of spawning habitat occurs within the low gradient reaches (<3% stream slope) of Class I-II streams, lake inlets and outlets. Sockeye spawning can also occur in lake gravels where sufficient substrate and up-welling are present. Pink salmon are also able to spawn in brackish water of intertidal influenced reaches associated with within the estuary.

Based on the number of miles of fish bearing stream and historical information, the following watersheds have been prioritized on fish productivity/spawning habitat: Watershed 5 (Karheen Creek), Watershed 4 (Kugan Point Creek), and then Watersheds 12, 8, 9, 10, 20, 14, 6, 1, 19, 3, 18, 2, 7 & 16.

The Karheen Creek sockeye primarily utilize and spawn in the mainstem (middle fork) of Karheen Creek and near Karheen Lakes I and II.

Comment 4.49 *Please field verify all streams in the project area. Fish streams that are marked on unit card maps, are not mapped on the larger island maps (e.g. Figure 2-6) The analysis of watersheds has relied to a large extent on interpretation of aerial photographs, rather than surveys. The DEIS says,*

> *"a large percentage of Class III and most Class IV streams…cannot be identified through interpretation of aerial photographs. The combined density of Class III and Class IV streams was estimated in the Watershed Assessment Resource Report (URS 2002e) by calculating the density of each class of stream per geologic type in the surveyed units of a watershed and extrapolating those values to the watershed." (DEIS, p.3-154)*

Response 4.49 The majority of the streams in the project area have been field verified and the associated GIS layers updated for analysis. All streams (including Class III & IV) within the units and along proposed road prisms will be marked and buffered appropriately during lay-out prior to harvest.

Comment 4.50 *The DEIS gives inadequate attention to the interplay of fisheries with other issues, in particular karst & watersheds, and wildlife habitat. Screwing up karst will screw up fish. Screwing up fish habitat will diminish marten habitat.*

It may be inappropriate to rely on Aquatic Habitat Management Units in a karst landscape. The class ranking system, and the large loophole for "nonstreams," exposes valuable aquatic habitat to destruction.

Response 4.50 Particular attention has been paid to the karst geology and vulnerable areas have been avoided to the extent practicable. For more information refer to the *FEIS, Chapter 3, Karst*, pp. 3-45 to 3-65.

Comment 4.51 *The role of the watershed analysis is unclear. The Fisheries section* [DEIS] *says a detailed analysis is provided in Issue 1, but Issue 1 refers to a watershed analysis that apparently is in the project file. Please do a thorough watershed analysis before even thinking about offering any more timber sales here.*

Response 4.51 Appendix J of the Forest Plan explains the role of the watershed analysis. Please see that document for more information. The Tongass made the decision not to conduct a watershed analysis for the Tuxekan Project because the issues that were to be covered in the watershed analysis were the same issues covered in the Tuxekan EIS. Please see the Draft Watershed Assessment Report for the Tuxekan Island Timber Sale completed by URS as well as Chapter 3 of the Final Tuxekan EIS completed by the Forest Service. Together, these documents cover the issues brought up in Appendix J in lieu of a watershed analysis. Also, refer to the *FEIS, Chapter 3, Hydrology*, pp. 3-14 to 3-45.

Comment 4.52 *Even given glaring deficiencies of the Road Condition Survey (RCS--see "Transportation" comments below), the DEIS goes on to rely on those surveys as the basis of understanding potential impacts to fish passage. (DEIS, p. 3-155) The RCS labeled 3 of the 5 known fish streams "red," meaning "conditions do not meet passage standards for juvenile fish." What is the logical conclusion to be made about the nine disappeared fish streams? The DEIS ignores this critical issue entirely. Please insure first-rate fish surveys have been done.*

Response 4.52 The FEIS uses the most current data. Only 4 of the 44 stream crossings in the Tuxekan Project Area have been categorized using the juvenile fish passage evaluation matrix. The two stream crossings categorized as "red" - impassible are located in Watersheds 7 and 12. The impassible culvert in Watershed 7 is located near the outlet of ADF&G cataloged stream 103-90-10980 on road 1470000, with approximately 0.5 miles of coho habitat upstream of this culvert. The second culvert in Watershed 12 blocks upstream migration in ADF&G cataloged stream 103-90-10895, blocking approximately ½ mile of upstream coho and pink salmon habitat. It is likely that additional "red" culverts may be documented when the remaining fish crossings are evaluated. Additional evaluation of fish passage is made in the *FEIS, Chapter3, Fisheries*, pp. 3-198 to 3-218.

Comment 4.53 *We are especially concerned about potential impacts to aquatic ecosystems due to harvest and roading of Class III and Class IV streams, nonstreams and subsurface flow. The DEIS estimates 115 miles of these streams in the project area, and we imagine that number to be very low. It is fair to say that most of what people understand to be streams are not, in fact, buffered from logging or roadbuilding.*

Response 4.53 All streams within the units and along proposed road prisms would be identified, marked and buffered appropriately during lay-out prior to harvest. Where possible, trees would be yarded and directionally felled away from Class IV streams however some soil displacement in and around the stream channel would occur. Trees can be felled to bridge the stream and partially suspended over the stream. Trees would not be yarded up or down the stream channel.

Comment 4.54 *It is correct under the regulations that riparian areas of Class IV streams "may be considered for timber harvest," but that doesn't mean you have to. (DEIS, p.3-101) Especially in the current situation, where cumulative impacts to riparian areas is already very large, buffering class IV streams is a reasonable option that should be considered.*

Response 4.54 Class IV streams would be identified and flagged during unit layout. Where possible, trees would be yarded and directionally felled away from Class IV streams.

Comment 4.55 *The Forest Service's own research shows that headwaters streams contribute measurably to fish productivity downstream as a source of fish food. Logging can have severe impacts on these watersheds, including on fish productivity. Wipfli and Gregovich report:*

> *Because fishless headwaters are so abundant in this coastal temperate rainforest, they may contribute substantially to the overall energy budgets of the fish-bearing habitats they flow into. The proposed alternative strategies to clearcutting in these forests will undoubtedly have profound and variable effects on the energy pathways of these upland streams, and the subsequent flow of material (e.g. invertebrates and detritus) to downstream food webs. (Wipfli & Gregovich 2002, p.966)*

The DEIS takes on this issue only when it says, "it is difficult to determine the potential impacts of harvesting near Class III and IV streams with respect to their ability to deliver sediment to nearby Class I channels (as in Karheen Creek and Kugan Point Creek)." (DEIS, p.3-158) Why is that difficult? Please do whatever surveys would be helpful, and work from the assumption that streams deserve maximum protection unless clear evidence indicates otherwise.

Response 4.55 The Forest Service acknowledges the importance of headwater streams and their linkages/contributions to downstream productivity of aquatic ecosystems. Therefore there is no timber harvesting proposed within riparian management areas (RMA) under any alternative. The majority of buffers afforded Class I, II and III streams within Karheen and Kugan Point Creek are approximately 300' from all perennial water courses that is three times greater than the current buffer widths recommended in the Tongass Forest Plan Standards and Guidelines. These buffer widths also comply with the Alaska Forest Resources and Practices Act of 1979 (as amended) Standards and Guidelines for timber harvesting and processing.

Thus, stream buffers, application of wind firm buffers on specific units, avoidance of steep/unstable slopes and road construction and stream crossing mitigation measures are expected to minimize negative direct, indirect and cumulative effects to a point where impacts to spawning gravel and salmonid production would not be detectable relative to background conditions.

Comment 4.56 *The proposed action would not conserve productivity of the soil. It would sacrifice long-term productivity for the short-term gains of logging.*

Response 4.56 All alternatives are compared for long term impacts to soil productivity using the R10 soil productivity guidelines, required by the 1997 Tongass Forest Plan Standards and Guidelines. Please refer to section “Soil productivity direct/indirect effects” and “Soil cumulative effects” for predicted impacts.

Comment 4.57 *The issues in this section are not adequately applied to analysis of impacts to karst, watersheds, aquatic habitat, silviculture, and roads. This section explains that clearcuts cause erosion, and that erosion clogs karst conduits and kills salmon, that shot-rock roads don't grow back forest, and a host of other information that condradicts reassurances offered elsewhere that impacts to fish, karst and watersheds will be minor.*

Response 4.57 The soils discussion was expanded in the FEIS to more adequately address these issues. Discussion considers impacts on soil productivity in addition to soil erosion to represent the potential impacts.

Comment 4.58 *Logging, especially on steep slopes, will cause erosion. Three units contain steep slopes larger than an acre and greater than 72%. Many other units contain steep sections that aren't one contiguous acre, but are still susceptible to erosion. Many of these steep sections are karst, so should have been classified "high vulnerability" and removed from the suitable timber base. Yarding through steep slopes risks damaging the residual stand, triggering landslides, and eroding soil.*

Response 4.58 The erosion potential was considered for all units with slopes > 72% per Forest Plan direction. Field evaluations focused on verifying planned harvesting on acreage greater than 1 contiguous acre with the assumption that smaller areas would be stable due to the broken slope topography and short pitches of limestone cliff-faces. Areas greater than 1 acre would be excluded from harvesting though may have cable yarding to access timber below. Based on the field data represented in the unit cards, only Unit 560-403 has these steep slopes larger than 1 acre, contrary to the discussion in the DEIS (see Unit Cards). See Soil erosion direct/indirect effects for further discussion.

Comment 4.59 *Logging and roadbuilding on wetlands will impact soil, watersheds, fisheries, karst and wildlife. Please consider these effects to wetlands in the Final.*

Response 4.59 These effects were considered in the final analysis. Refer to the *FEIS, Chapter 3: Hydrology* (pp. 3-14 to 3-45); *Karst* (pp. 3-45 to 3-65); *Wildlife* (pp.3-160 to 3-198); and *Fisheries* (pp. 3-198 to 3-218).

Comment 4.60 *Please do an honest and complete analysis of the actual timber demand in this area. What evidence do you have of market demand for this sale? Please be more specific about demand.*

It seems to us there isn't really much demand for these trees, and that nobody would suffer if you forgot about this timber sale.

Response 4.60 The Tuxekan Island Timber Sale project responds to goals and objectives identified in the Forest Plan, one of which is to provide a timber supply sufficient to meet the annual and planning cycle market demands for Tongass National Forest timber. Others include providing resource production opportunities and employment for local communities.

Appendix A of the FEIS displays how the Tuxekan Island Timber Sale project relates to the Forest-wide timber program for the next 10 years, and discusses market demand for the Tongass. The annual market demand for timber is developed based on the document "Evaluating the Demand for Tongass Timber" (Morse, 1998), which forms the basis for how these estimates are developed. Final procedures are located in Responding to the Market Demand for Tongass Timber (Morse, 2000). The document, Tongass National Forest Timber Sale Procedures (Morse, 2000), explains the process used to determine the volume of timber offered each fiscal year. The Regional Office updates the demand analysis annually. The results of that analysis form the basis for the Tongass' planned timber offer for the current year of the Ten Year Timber Sale Schedule pending sufficient funding to do so.

Comment 4.61 *We are very concerned about the cumulative impacts of the proposed action and continued old-growth logging in the area. According to the DEIS, 43% of the old-growth on the island has been cut already, and this timber sale would increase that to 47%. Under the Forest Plan, at the end of the first cycle (2095) "the remaining old-growth forest stands would occur primarily in the four small OGRs, in riparian and beach fringe buffers, and in other areas of POG considered unsuitable for timber management." At that point, the wildlife value of Tuxekan island will be severely damaged, and many species might be expected to leave the island forever. The DEIS does not adequately disclose or consider this information.*

Response 4.61 Direct, indirect and cumulative effects of the alternatives are disclosed in the FEIS. This has been updated to incorporate recent small sales on the island, as well as additional effect analysis. Current levels of timber harvesting across the Tongass are below what was predicted in the Forest Plan. Less than half of the annual allowed harvesting has occurred during the first 5 years of plan implementation (Determination from the 5-year Review of the Tongass Forest Plan (12/2004). Therefore, the magnitude of timber harvesting and the potential impacts on biodiversity over the whole Forest have been less than those forecast in the Forest Plan. Forest Plans are reviewed and revised on a regular schedule and revisions are made where needed. Any predictions made for the year 2095 were made assuming that the current Forest Plan was in effect for 100 years.

There are no reasonably foreseeable future timber harvesting plans on Tuxekan Island, either on Forest Service or State lands. In addition, the Forest Service 10-year timber plan does not forecast any additional harvesting on the island. The current project was designed to be consistent with the Forest Plan Conservation Strategy and Standards and Guidelines and the effects analysis did not determine that species viability would be affected.

Comment 4.62 *What do you mean that "salvage would remove barriers to travel…"? (DEIS, p. 3-146) Please disclose the scientific basis for this.*

Response 4.62 Areas of extensive blowdown can result in barriers to movement for some species (like deer), while it may have no effect on other species. The reference quoted from the DEIS is about the salvage of blown down trees along the existing road system; in this case the discussion was referring to human use on the road system. This discussion is not in the FEIS.

Comment 4.63 *Please evaluate the chances that species will disappear from the project area. This project, being an island, offers unique opportunities to study and quantify whether it can support, say, a pack of wolves, or a nesting goshawk pair. The DEIS only evaluates critters in terms of NFMA's viability requirement (which has since been rescinded), not the impact of alternatives on the project area.*

Response 4.63 Effects on wildlife species are addressed in the FEIS in Chapter 3 for threatened, endangered, Region 10 Sensitive, MIS and other species of concern. Refer to the *FEIS, Chapter 3, Wildlife*, pp. 3-160 to 3-198.

Comment 4.64 *We are concerned with the impacts of fragmenting the remaining old-growth forest even more. The DEIS does say that,*

> *"Fragmentation has the potential to isolate small populations, contribute to decreased population distribution, and increase the likelihood of local extinction….Interior habitat retains moisture, temperature, and vegetation conditions that are unique to old-forest conditions. Old-growth-dependent species typically thrive in interior forest habitat conditions and tend to be sensitive to …edge effect…100 meters or more into the forest (Temple 1986; Concannon 1995)."*

However, except for this truthful exposition, these impacts are not considered in terms of this specific project. What critters are sensitive to edge effects? What are the impacts to them?

Response 4.64 Additional analysis of the direct, indirect and cumulative effects of fragmentation on habitat connectivity has been included in the FEIS. The old growth habitat strategy, which was used in developing the Forest Plan, has been incorporated into this project. This includes the old growth reserves, as well as the incorporation of beach/estuary buffers and riparian buffers and management direction for the matrix between the old growth reserves. The Forest Plan does not require maintenance of landscape connectivity between small OGRs. Because of extensive past harvesting on the island, connectivity was incorporated into developing the alternatives, and is addressed in the analysis. These measures were used to assure that the project was meeting Forest Plan Standards and Guidelines and the Conservation Strategy, which were designed to maintain species population viability.

Because the project area lies in a high risk biogeographic province where over 33 percent of the productive old growth has been converted to young stands, additional marten and goshawk guidelines have been incorporated into the project design, per Forest Plan direction.

Individual species that may be affected by fragmentation or loss of connectivity, such as flying squirrel and marten, are addressed in the *FEIS, Chapter 3, Wildlife*, pp.3-160 to 3-198.

Comment 4.65 *While landscape connectivity is important, it is not "at least as significant for maintaining diversity as the size of the blocks." To the contrary, studies have shown that details of the arrangement of reserves and corridors have less impact on biodiversity than does the simple fact of habitat loss. (Fahrig 1997)*

What is the basis for your understanding of the "main dispersal corridors" in the project area? For example, the "narrow north-south corridor in the center of the island," (DEIS, p.3-126) what wildlife have been observed using it? It is unclear if the proposed corridors are established on the ground. Please establish that corridors are being used by wildlife by going into the forest and looking and listening, before depending on them to compensate for planned habitat destruction.

Response 4.65 Habitat loss has been evaluated for each of the analyzed species. In addition, connectivity was addressed for those species where it could be an issue. Potential wildlife corridors were identified in the *FEIS, Chapter 3, Issue 3a, Habitat Connectivity*, pp 3-94 to 3-97. These were identified based on research that suggests that riparian areas, low elevation passes and shorelines are used as movement corridors (Forest Plan FEIS, 1997). They are not established on the ground, but are present and available for use by a variety of wildlife species. Actual use of these corridors was not studied.

Comment 4.66 *What is the meaning of the term "moderate effect on forest fragmentation," as used to describe Alternatives 2 and 4?*

Response 4.66 The analysis has been updated and no longer uses these terms. The analysis now refers to habitat connectivity and old growth reserves. Refer to the biodiversity analysis in the *FEIS, Chapter 3, Biodiversity*, pp. 3-78 to 3-99.

Comment 4.67 *Fragmentation is already severe. Connectivity between the old-growth reserves is "restricted by second-growth." (DEIS, p. 3-126) Given that the north-south corridor is pinched by old clearcuts and adjacent proposed units, how much value as dispersal habitat does it really have? How can it be that "current connectivity is provided by riparian areas, mountain passes, and the 1,000-foot beach fringe area," given the extensive past harvest of them?*

Response 4.67 Discussion of wildlife corridors and connectivity has been updated and is found in the *FEIS* (*Issue 3a, Habitat Connectivity* pp 3-94 to 3-97). Effects of past harvesting in corridors such as riparian areas and beach buffers were incorporated.

Comment 4.68 *What is the basis for the DEIS analyzing forest fragmentation just by measuring average unit size and total harvest? More important is the amount of interior forest habitat that would be left.*

Response 4.68 The effects section in the *FEIS* (*Issue 3a, Habitat Connectivity* pp 3-94 to 3-97) has been updated and does not focus on unit size. Rather than looking at patch size and interior forest, the updated analysis includes an analysis of the effects of changes to the small OGRs and connectivity between them. This was done to assure that the project was meeting Forest Plan Standards and Guidelines, and the Conservation Strategy, which were designed to maintain species population viability. . Old growth reserve

design criteria (found in Appendix K of the Forest Plan and used to develop the Interagency OGR), includes criteria for shape. Circular shapes rather than linear shapes reduce the amount of edge habitats and increases the amount of interior forest habitat.

Comment 4.69 *Please also consider the impact of roads in terms of fragmentation*

Response 4.69 The effects of road corridors in small OGRs and effects on connectivity have been included in the *FEIS, Chapter 3, Biodiversity*, pp. 3-77 to 3-99.

Comment 4.70 *The Forest Service places a great deal of faith in OGRs to compensate for habitat lost and degraded due to planned harvest and roadbuilding. Practically everything else will be logged. This makes adequacy of the OGRs paramount. However, reserves on the island are plainly inadequate.*

Of the presented options for old-growth habitat reserves, we most support alternative 4. Connecting the two small reserves in VCUs 5600 and 5872 is a good idea.

Please preserve connectivity between small OGRs, and between them and medium and large OGRs. It is important to note the TPIT policy clarification suggests connectivity between small OGRs isn't important only because it envisions productive old-growth in beach fringe and riparian areas. That is not the case in the project area, where the beach fringe and riparian areas have already been heavily logged.

Response 4.70 See Response to Comment 1.3.

The Forest Plan does not require maintenance of landscape connectivity between small OGRs, but because of extensive past harvesting on the island (including riparian areas and beach fringe), connectivity was incorporated into developing the alternatives, and is addressed in the analysis (see *FEIS, Chapter 3, Biodiversity*, pp. 3-77 to 3-99).

Alternatives 2, 4 and 5 connect the two small old growth reserves in VCUs 5600 and 5872.

Comment 4.71 *The way the VCU 5560 reserve is arranged under Alternative 3 does not comply with the Forest Plan. Calling the beach buffer an old-growth habitat reserve does not accomplish the goals and objectives of Forest Plan, particularly as it has been clearcut in the past.*

Will reserves be sufficient to prevent extirpation of wildlife species from the island? Could these four small reserves support a wolf pack? A nesting goshawk pair?

The beach and estuary fringe S&G, page 4-4, requires that you consider protecting additional forest to meet the intent of the strategy. The TPIT Clarification says,

> *"In some locations the past harvest is extensive enough that additional productive old growth beyond the beach fringe may be needed to meet the intent of the strategy. The project NEPA analysis should consider maintaining additional habitat in these locations in cooperation with the USFWS and ADF&G."*

Please do so.

Response 4.71 The current old growth reserves do not meet Forest Plan direction. As discussed in the FEIS, an Interagency Committee recommended changes to the OGRs to meet Forest Plan direction and improve habitat. The VCU boundary for 5560 under Alternative 3 is long and narrow, and does include some past harvest. Numerically, Alternative 3 meets Forest Plan direction for number of acres and percent productive old growth. Alternatives 4 and 5 incorporate the Interagency Committee recommendations to modify the small OGR boundaries. Alternative 2 incorporates most of the recommended boundary changes. The OGRs in Alternatives 2, 4 and 5 provide the best habitat as disclosed in the FEIS.

The reserves are small old growth reserves and would not individually support wolf packs or goshawk nest pairs, but are part of a larger conservation strategy that addresses viability over larger areas.

The Forest Plan does not require maintenance of landscape connectivity between small OGRs. Because of extensive past harvesting on the island (including riparian areas and beach fringe) connectivity was incorporated into developing the alternatives, and is addressed in the analysis (see *FEIS, Chapter 3, Biodiversity*, pp. 3-77 to 3-99).

Comment 4.72 *What is the basis for the conclusion that OGRs, alternatives to clearcutting, and the Forest Plan S&Gs "are expected to provide sufficient habitat" for river otter, re-breasted sapsucker, Vancouver Canada goose, and bald eagle? The Forest Plan alone is not an adequate basis for declining to consider impacts to these MIS. Especially given recent Forest Service direction holding that Forest Plans are flexible and non-binding, it is improper to also rely on Forest Plans to avoid project NEPA analysis.*

Please consider project impacts to MIS, particularly river otter, sapsuckers, geese and eagles.

Response 4.72 The FEIS includes a summary of effects on MIS. Refer to the *FEIS, Chapter 3, Wildlife, MIS Accounts*, pp 3-171 to 3-192, and wildlife reports in the project record.

As stated in the *FEIS* (page 3-170), there is a low potential for effects to river otters and Vancouver Canada goose. This is due to the lack of, or low number of sightings; no direct effects on potential habitat; and/or the incorporation of Forest Plan direction to mitigate the effects of disturbance if these species are found. More analysis for these species is found in the project record. The analysis for red-breasted sapsuckers and bald eagles has been updated, and is included in the *FEIS, chapter 3, Wildlife*, pp 3-189 to 3-192.

Comment 4.73 *Thanks for giving special attention to deer. As the DEIS recognizes, deer play a critical role in the ecosystem, and are a key subsistence species. The proposed action will remove and fragment old-growth forest, which is essential winter habitat for deer. Given past and proposed harvest, a single harsh deep-snow winter could devastate the island deer population. Please more seriously consider the impacts, especially the cumulative impacts, of this project. Don't let it be the straw that broke the camel's back.*

ADF&G surveys have showed deer number to be low, perhaps dangerously so. Over 7,000 acres are already in the stem exclusion phase, and will be useless for deer winter forage for a century. Your deer model results show a decrease of nearly 50%.

Proposed action will have severe impacts to deer. Unit cards show that predominantly high value deer habitat is targeted for logging. Loggers and deer in winter prefer the same, exact stands on Tuxekan Island.

The HCI model is an inadequate basis for these conclusions, and is being applied improperly. As the DEIS admits, "the model does not recognize the small differences in the acres of harvest," in the various alternatives. (DEIS, p.3-135) The DEIS model shows high deer habitat capability, and low deer populations. (DEIS, p.3-133) How do you settle the difference between these two contradictory pieces of evidence? The HCI results are not a "worst case scenario." (3-134) If you insist on using the HCI model, please be sure that it is properly applied, and that results are properly interpreted.

Running the HCI model into the future isn't sufficient analysis of cumulative effects. It does, however, raise the alarming fact that habitat capability is expected to drop precipitously in the next forty years. It would have been even more informative to extend the model into the year 2095, when the only remaining old-growth is in the small reserves, and along some of the beaches and streams. You would almost certainly find that deer habitat capability was not sustainable. In any event, what we read as an alarm bell the DEIS actually takes as comfort, saying,

> *"Although past harvest has reduced deer habitat, and future timber harvest will reduce it further, the additional reduction would be less in comparison to those incurred to date." (DEIS, p. 3-147)*

Response 4.73 Additional analysis of the effects on high-value deer winter range and populations has been included in the *FEIS, Chapter 3: Issue 3 – Wildlife*, pp 3-75 to 3-122; *Wildlife, MIS Accounts, Sitka Black-tailed Deer*, pp. 3-171 to 3-176.

The ADF&G provided a letter during the scoping period, that said, "on the basis of sign observed during our on-site visit, it appears that the area has a relatively-low density deer population, most likely because of the abundance of closed-canopy second growth habitat in the project area". They recommend the use of the deer model and looking at high-value habitat during project planning. This was completed.

Comment 4.74 *The DEIS does not appreciate that deer are a part of an ecosystem. Instead, it just assumes more deer is always good, and less deer is always bad. What are the impacts of overpopulation of deer following years with mild winters, and explosion of easy browse in clearcuts? It is not true that "this new forage will mitigate declining forage production in the existing second-growth stands…" because the limiting factor is winter habitat, not summer browse. Even more summer browse, when it's plentiful, does nothing to mitigate lack of critical habitat during winter.*

Response 4.74 The FEIS discloses that the winter availability of forage is the most limiting factor on black-tailed deer. The deer model (which analyzes winter habitat), and modification of high-value deer winter habitat were used to compare the effects of the alternatives. In addition, an analysis of high value habitat was included in the analysis.

The statement that new forage would mitigate declining forage production in existing second growth stands is accurate. The existing second growth stands are not providing winter habitat (except maybe during low snow winters) but are expected to be providing summer forage. Forage would decrease in the second growth when it reaches the stem exclusion stage. Proposed harvesting would decrease winter forage availability due to changes in canopy cover and snow interception, but would increase summer forage availability. Therefore, forage produced in the new harvest areas would replace summer forage being lost as second growth moves into the stem exclusion stage.

Comment 4.75 *While this species adapts well to just about anything the proposed action would degrade black bear habitat. The DEIS is correct to note that increased roads and people will kill some bears. However, the general approach is just to rely on the Forest Plan. The DEIS says, "based on" the Forest Plan OGRs, beach fringe buffers and RMAs, the DEIS concludes "the project is not expected to have significant effects on the black bear." (DEIS, p. 3-137) As explained above, these things are not, in themselves, a sufficient reason to avoid evaluating project impacts on bears.*

Response 4.75 Effects on black bear are found in the Wildlife Report in the project record.

The FEIS includes some summary conclusions. Black bears are considered habitat generalists. The riparian habitats and beach/estuary habitats are protected under Forest Plan Standards and Guidelines. The implementation of the Access Management Plan would occur under all alternatives. There is no clear difference between the effects of the alternatives on black bears and they are not discussed further in the FEIS. Additional analysis is found in the Wildlife Report in the project record.

Comment 4.76 *Action alternatives would cause significant negative impacts to marten. Preferred denning and resting habitat for marten is old-growth forest, with large trees, snags, and abundant coarse woody debris. Proposed logging units and roads would remove and fragment exactly these habitats. On a 100-year rotation cut stands will not provide critical marten habitat. (Schenck, 1997)*

While Tuxekan may not currently have sustained trapping pressure, during the proposed sale it probably will. The (old) harvest data in table 3-20 show as many as 30 marten were harvested in 1997. The proposed action could sustain enough trapping pressure to significantly affect the marten population on its own, and especially if followed by commercial thinning after 2010, etc.

Response 4.76 The analysis on marten includes loss of habitat, and the potential for increased vulnerability to trapping. For detailed information, refer to the *FEIS, Chapter 3, Wildlife, MIS Accounts, American Marten,* pp. 3-177 to 3-183.

Comment 4.77 *Proposed reserves do not comply with the Forest Plan mandate to leave canopy cover for marten. The reasons given (DEIS, p.3-138) for violating the standard ("uniformly distributed throughout the stand") in order to use clearcuts range from insufficient ("risk of windthrow") to absurd ("leave refugia for plant species").*

Response 4.77 The rationale for modification of the clearcut with reserves prescription is explained in the *FEIS, Chapter 3: Wildlife, MIS Accounts, American Marten,* pp. 3-177 to 3-183 and *Vegetation Management, Vegetation Management Direct and indirect Effects, Silvicultural Prescriptions, Clearcut with Reserves,* pp 3-140 to 3-141.

Comment 4.78 *"Clearcut with reserves," with unharvested adjacent areas, does not meet the biological function of the S&Gs. For example, "a more open canopy in young regenerating forests provides less protection from avian predators than does a dense canopy in uncut coniferous forests." (Thompson, 1994, p.273) If reserve trees were left scattered through the unit, which would provide some cover for marten. The proposed clearcuts are no less open to predators for the fact of reserved and deferred areas adjacent. In fact, those reserves are themselves compromised habitat due to edge effects. Marten may be more vulnerable to predators on forest edges.*

Response 4.78 It is recognized that the harvested portions of the clearcut with reserves units would no longer provide suitable habitat for marten. Because of the high risk of loss of residual tree to windthrow, modifying the prescription would provide the best way to ensure that residual canopy cover was retained over the long term. Refer to the *FEIS, Chapter 3: Wildlife, MIS Accounts, American Marten, American Marten Direct and Indirect Effects,* pp. 3-179 to 3-182, and *Vegetation Management, Vegetation Management Direct and indirect Effects, Silvicultural Prescriptions, Clearcut with Reserves,* pp 3-140 to 3-141.

Comment 4.79 *What are the impacts of road management alternatives on American marten? The peak road density seems an obvious cause for alarm for marten. The DEIS notes only that current alternatives will reduce open-road density to 0.92 mile per square mile, down from the current 1.4. Left out of that equation are two numbers which are more significant: 2.5 mi/sq mi, the peak road density during operations; and 0.6 mi/sq mi, the level at which any significant mitigation of impacts to marten might be expected.*

Response 4.79 Where marten mortality concerns have been identified, the Forest Plan specifies studies on mortality factors and interagency cooperation on management practices, including road management and hunting/trapping regulations, to maintain marten mortality levels at sustainable levels (USDA FS 1997a). Concerns have not been raised for Tuxekan Island. The Forest Plan requires effective road closures as a measure to reduce marten mortality that has been caused by an increase in road access. Road construction by alternative is described in the "Road Management" section of this chapter. The construction of proposed temporary and NFS roads would have short-term effects (less than 10 years) to marten by increasing the possibility of mortality due to trapping. Table 3 94 shows the open road densities and total road densities (includes both NFS and temporary roads), both during project activities, and after implementation of the Access Management Plan.

The access management plan has been designed to reduce open-road density in the analysis area in all action alternatives. After project completion and implementation of the access management plan, the open-road density of the analysis area would be reduced from the current 1.4 mile per square mile to 0.8 mile per square mile in all action alternatives. Table 3-94, p. 3-181, shows these road densities.

Currently the marten trapping season in Game Management Unit 2 (GMU 2), which is Prince of Wales Island and the outer islands to the west, runs from December 1 to February 15. Since the winter shut-down period is from approximately November to mid-April, there would be no overlap between project activities and trapping season. Trapping pressure would not increase due to workers being on the island, but could increase temporarily while new roads are open and providing access into new areas. Current levels of road access have not resulted in concerns of overharvesting of marten. Not all new roads would be open at the same time, so open road densities would not go up quite as much as shown in Table 3-94, but the new roads would still provide access into new areas. All action alternatives would result in an overall decrease in ORDs after implementation of the Access Management Plan.

Comment 4.80 *In the probable event of concerns for marten mortality, the Forest Plan only provides for studies and consultation about road management and trapping regulations.*

Response 4.80 The Forest Plan also includes direction for the maintenance of viable populations. Studies, changes in habitat management and road management and trapping regulations are potential ways to address concerns. This project is in compliance with the Forest Plan.

Comment 4.81 *Cumulative effects to wolves are alarming. According to Person (2001), the wolf population in GMU 2 will decline by 25% in the next forty years "as a result of the combined effects of past timber harvest and future management," to a level less than half what was there before industrial logging stared.*

Wolves populations on fragmented islands, like this one, are particularly vulnerable to extreme fluctuations. (Darimont et al, 2004; Person et al, 1996) The study in Canada by Darimont et al (2004) notes that logging threatens stable populations of deer and salmon, particularly on islands.

> *"If current planning processes aim to preserve this remnant population of wolves in its current form (Darimont & Paquet, 2002), we suggest that plans include significant protection of critical habitat for deer and salmon, especially on islands. Moreover, in any ecosystem, a system of reserves must have appropriate connectivity to permit gene flow (Soulé & Simberloff, 1986). Our data suggest that connectivity should also be considered to accommodate fluctuations in population structure to prevent predator-prey disequilibria, to which fragments may already be predisposed." (Darimont et al 2004, p.1875)*

Is there a 50,000-acre reserve of roadless wildland in the 192,000-acre landscape encompassing the project area? The need for large roadless and unfragmented reserves in biogeographic provinces such as this is recognized in the Forest Plan. The DEIS doesn't analyze impacts, while it does acknowledge the issue (3-140).

Response 4.81 Both the OGRs and connectivity are important to deer, which are important prey for wolves. Alternative 5, which is the Agency Preferred alternative, incorporates the Interagency Recommendation and addresses connectivity issues.

The project area (island) is only 17,730 acres and is only a portion the home range of the Staney Creek wolf pack. A discussion about OGRs and unroaded areas has been included in the wolf analysis in the FEIS. For further information, refer to the FEIS for information on wolf use on Tuxekan Island (*FEIS, Chapter 3, Wildlife, MIS Accounts, Alexander Archipelago Wolf*, pp. 3-183 to 3-187).

Comment 4.82 *It is inappropriate to rely exclusively on the deer habitat capability model to predict effects to wolves. First, it disregards the warnings of a major deer population crash as the results of logging combine with a deep-snow winter. As deer is the wolves' primary food source, it is hard to see that Tuxekan island would have much value as wolf habitat if the deer population crashed. Second, there are the problems with that model, that we outlined above and are being brought to light by other organizations. Third, even if the model were perfect, deer are only part of the story for wolves. "Functional relationships, e.g., prey vulnerability and feeding dominance, can influence wolf productivity independently of ungulate biomass per wolf." (Boertje & Stephenson 1992, p.2441)*

Response 4.82 The analysis for wolves has been updated and addresses changes to secure habitats as a result of roading and vulnerability to hunting and trapping, as well as changes to prey populations.

Comment 4.83 *What are the impacts of the various road management alternatives on wolves? Why not reduce open road density to below 0.7, in consideration of wolves?*

Response 4.83 The development of the Access Management Plan incorporated many concerns, both for wildlife and for maintaining public access on Tuxekan Island. For further information on potential effects of roads on wolves, refer to the *FEIS, Chapter 3, Wildlife, MIS Accounts, Alexander Archipelago Wolf*, pp. 3-183 to 3-187.

Comment 4.84 *Road construction and reconstruction raises concerns for wolf viability. Cumulative effects of proposed roads on wolves would be severe. Peak open road density under action alternatives will exceed 2.0 mi/sq mi, the level at which "unsustainable mortality is certain," according to the probability estimates developed by Person (2002) (DEIS, p. 3-141). Rather than using, say, a 1:4 figure, the DEIS only discloses that long-term road miles will be reduced to "slightly less than the 50/50 risk estimate." Later, 0.92 is cited as "a level compatible with Forest Plan Standards and Guidelines for wolf viability." (DEIS, p. 2-147)*

Response 4.84 Because all action alternatives (1) maintain deer habitat capability over the long term; (2) result in lowered open road densities (there is a lack of a real hard basis for the 1 mile per square mile threshold, it is based on personal opinion of D. Person, who has done work on wolves in Southeast Alaska but does not have real, published peer-reviewed data to support a specific road density); (3) low hunting and trapping pressure on Tuxekan (again based on D. Persons professional opinion, June 24, 2002); and (4) that

GMU 2 does not have a sustainability problem due to a state 30 percent Harvest Guideline that allows closing the hunting and trapping season when guidelines are reached (D. Person, pers. comm.June 24, 2002), there should be no long-term cumulative effects on wolf populations.

For further information on potential effects of roads on wolves, refer to the *FEIS, Chapter 3, Wildlife, MIS Accounts, Alexander Archipelago Wolf*, pp. 3-183 to 3-187.

Comment 4.85 *Roads can impact wolves in ways other than providing access to hunters, for example by making prey more easily available and building travel corridors (Person et al. 1996).*

Response 4.85 All action alternatives improve the ability of the small OGRs to provide secure habitat for wolves, even though they are small and were not designed with wolves in mind. This is due to larger size, and well as re-drawing the boundaries to have them better meet the Forest Plan criteria (see the Biodiversity section). Alternatives 2, 4 and 5 provide the most improvement and would be most beneficial to wolves. All action alternatives have similar effects on currently unroaded areas that might provide some secure habitat. The eastern and western unroaded areas (that correspond to small OGRs) are unaffected and would remain unroaded and provide secure habitat. The northernmost unroaded area has a unit with a temporary road location under all alternatives. Once the temporary road is decommissioned, it may provide some secure habitat, although walk-in access to hunters and trappers would be improved.

During timber sale activities there is generally a greater risk of increased mortality from hunting, trapping, and illegal harvesting due to the increased presence of people and higher open road densities. However, since the wolf hunting and trapping season (December 1 to March 31 in GMU 2 for the 2005 season) coincides with the normal winter shutdown of logging operations, the number of people on the island during the winter hunting and trapping seasons would not increase as a result of the project. There is still the potential for increased mortality from illegal harvest. Alternative 3 results in the highest number of level of human activities and therefore has the greatest potential for illegal wolf mortality from humans. Alternative 5 would be pretty similar but would have a little less risk than Alternative 3.

For further information on potential effects of roads on wolves, refer to the *FEIS, Chapter 3, Wildlife, MIS Accounts, Alexander Archipelago Wolf*, pp. 3-183 to 3-187.

Comment 4.86 *Action alternatives will have significant, negative impacts on hairy woodpecker. Available old growth habitat and snags will be substantially reduced. Forests will be fragmented by clearcuts and roads, leaving few patches larger than 500 acres. Hairy woodpeckers are only one of forty-two critters who nest or den in old-growth tree cavities. If woodpeckers are suffering, then those others probably are too. MIS species are not usefully evaluated only in a vacuum. The information should be applied to the ecosystem as a functioning whole.*

The level of analysis in the DEIS is wholly inadequate. A scant three sentences are devoted to explaining "environmental consequences" of action alternatives. Of them, none discloses an impact.

The DEIS merely repeats that Forest Plan S&Gs for snags for marten and goshawk will be followed. Based on this, the DEIS concludes, "the project is not expected to have significant impacts on the hairy woodpecker." (DEIS, p. 3-142) Impacts in terms of fragmentation are not mentioned, A great deal more analysis, including field surveys, is to take a hard look at impacts.

Response 4.86

Because the hairy woodpecker nests in cavities, snag density has a direct relationship with population levels. Primary habitat is considered to be old-growth forests in patches larger than 500 acres (USDA FS 1997a). Old-growth forests provide the highest snag retention levels and continually supply snags to the forest. The Forest Plan contains standards and guidelines that prescribe the provision of habitat for cavity-nesting species, including the retention of reserve trees (hard or soft snags) within all LUDs (USDA FS 1997a).

Coarse-structured (multi-aged, large trees) low elevation forest is important for several wildlife species including deer, goshawk, forest songbirds, and cavity nesters. Timber volume classes 6 and 7 (from the GIS cover existveg) are believed to be an adequate predictor of those types of stands (Caouette et al. 2000). The analysis area contains a total of 5,048 acres of volume class 6 and 7 stands, as shown in Table 3 91.

Hairy woodpeckers were observed several times in the Tuxekan analysis area in 2000. No specific surveys have been made to estimate its population distribution or density.

The amount of POG habitat has been greatly reduced over the project area due to past harvest; 44 percent of the island is second growth. Adjustment of small OGR boundaries to meet interagency recommendations (Alternatives 2 with modifications, 4 and 5) would contribute towards the Forest Plan goal of maintaining viable hairy woodpecker and other cavity nester populations across the landscape.

Refer to the *FEIS, Chapter 3, Wildlife, MIS Accounts, Hairy Woodpecker,* pp. 3-188 to 3-189, for a full disclosure on the updated effects analysis on hairy woodpecker.

Comment 4.87

The Prince of Wales flying squirrel appears to be under tremendous pressure in the project area from the cumulative impacts of logging and roading on Prince of Wales and area islands. Proposed actions do not adequately protect flying squirrels. Large live trees, large snags, large fallen trees, multi-layered canopies, and contiguous habitat are all in short supply—and made more so by the proposed action. Additional habitat loss and fragmentation are proposed.

What is the basis for the conclusion that "All action alternatives would maintain flying squirrel habitat through modifications to the four small OGRs?" (DEIS, p.3-143) The conclusion that impacts to squirrels are moderate, or acceptable, appears to be capricious.

Response 4.87

There are 8,633 acres of productive old-growth forest in the analysis area (NFS lands on Tuxekan). Based on existing vegetation data, there are approximately 1,060 acres of muskeg and low productivity mixed conifer sites that may be similar to the peatland-scrub mixed conifer forest type that was found to be used by flying squirrels.

Mitigation would include: The STS units would have less than 30 percent of the unit volume and/or less than 50 percent of the existing canopy designated for harvest. The residual canopy, along with the regeneration would result in a mosaic of multiple age classes, maintaining forested structure for connectivity.

All action alternatives would address flying squirrel habitat through modifications to the four small OGRs in the Tuxekan project area. Each small OGR would meet or exceed Forest Plan minimum size requirements and POG requirements. Alternative 4 would provide the most protection of current corridors between small OGRs in the analysis area and have the lowest effect to the flying squirrel through deferral of several harvest units followed by Alternative 5. The principal stream corridors are Karheen Creek (east-west), the north fork of Karheen Creek (north-south), and two east-west creeks near Scott Lagoon on the western coast. Alternatives 2 and 3 would have the greatest effects on flying squirrel movement due to harvest of units 560-405 and 560-428 that disrupt a portion of the east-west corridor between the small OGRs in VCUs 587.2 and 560. In all alternatives, unit placement, reserve area locations, and the STS with reserves prescription for unit 560-412 would maintain the north-south corridor. Alternatives 4 and 5 provide a wider corridor between the small OGRs in VCUs 587.2 and 557, compared to Alternatives 2 and 3. Based on acreage harvested, Alternative 3 would have the greatest impact followed by Alternative 2. Alternative 4 would have the least impact to the flying squirrel, followed by Alternative 5. Implementation of riparian and beach/estuary buffers would also contribute to maintenance of connectivity between OGRs.

Table 3 45 POG by volume strata in the Analysis area (NFS lands) shows the amount of productive old-growth that would provide habitat after implementation of any of the alternatives. Alternative 3 has the greatest effect as this alternative incorporates more CCR units. Alternative 4 has the least effect as it incorporates less harvest, and places more emphasis on the use of STS methods.

Because of the new information on use of other habitats, the risk of extirpation is predicted to be lower than analyzed for the Forest Plan. The small OGR strategy of the Forest Plan was designed to meet the needs of old-growth associated species. The additional requirements for stand structure under the marten and goshawk standards and guidelines would also maintain the value of habitats for flying squirrels. Implementation of project activities proposed in all alternatives may adversely impact individuals but are not likely to result in a loss of viability in the Planning Area, not cause a trend toward federal listing.

More recent research has found that flying squirrels also use peatland-scrub mixed conifer habitats as well (Smith and Nichols 2004), so these old growth corridors may not be as necessary for connectivity for this species as previously thought.

See *Chapter 3, Wildlife* pp. 3-193 to 3-194.

Comment 4.88

What is the basis for using major streams to provide connectivity for squirrels. Do flying squirrels travel along major streams?

Response 4.88 Prince of Wales flying squirrels were thought to use contiguous old growth forest or corridors of suitable habitat, as discussed in the FEIS. This may be along riparian corridors, but also includes other corridors of suitable habitat, such as a secondary corridor displayed on the No Action Alternative 1 map in the FEIS. These corridors are discussed in the connectivity section.

More recent research has found that flying squirrels also use peatland-scrub mixed conifer habitats as well (Smith and Nichols 2004), so these old growth corridors may not be as necessary for connectivity for this species as previously thought.

Comment 4.89 *How do flying squirrels deal with helicopters?*

Response 4.89 No literature was found that discussed the effects of disturbance from helicopters on flying squirrels. Because they are nocturnal and helicopter activity would occur during daylight hours, effects should be limited.

Comment 4.90 *What is the risk that Prince of Wales flying squirrels could be extirpated from Tuxekan Island?*

Response 4.90 Because of the new information on use of other habitats, the risk of extirpation is predicted to be lower than analyzed for the Forest Plan. The small OGR strategy of the Forest Plan was designed to meet the needs of old-growth associated species. The additional requirements for stand structure under the marten and goshawk standards and guidelines would also maintain the value of habitats for flying squirrels. Implementation of project activities proposed in all alternatives may adversely impact individuals but are not likely to result in a loss of viability in the Planning Area, not cause a trend toward federal listing.

Comment 4.91 *It is absurd that the results of a study completed in 2001 cannot make it into an EIS released in late 2004.*

Response 4.91 The effects analysis for flying squirrels has been updated in the FEIS and incorporates recent literature.

Comment 4.92 *Project impacts to murrelets are unacceptable. Habitat loss and fragmentation top the list. We are also concerned about impacts of helicopters on murrelets, especially while they are nesting. Please do not allow helicopters during murrelet nesting season.*

Old-growth forest fragmentation will adversely effect marbled murrelets. "[M]anagement efforts should focus on protecting or creating large, contiguous blocks of old-growth forest, especially in areas near the coast." (Meyer & Miller 2002, p.755) The project does the opposite.

Response 4.92 Mitigation measures for marbled murrelet include: Protect active marbled murrelet nest with a 600-foot windfirm buffer, where available. Minimize disturbance during the nesting season (May 1 to August 15).

The only known nest location is in the small OGR around Jinhi Bay (small OGR for 556) under Alternatives 2, 4 and 5. Under Alternatives 1 and 3, the known nest location is on the edge of the small OGR. Helicopter logging of unit 557-433 (Alternatives 3-5) should cause no disturbance as

it is over a mile away, and logs would be taken to the west, away from the nesting area.

Based on the modifications to the old-growth reserve strategy, beach and shoreline buffers and the large population of marbled murrelets in Southeast Alaska, the project is not expected to have a significant effect on the marbled murrelet. Implementation of project activities proposed in all alternatives may adversely impact individuals but are not likely to result in a loss of viability in the Planning Area, not cause a trend toward federal listing.

Refer to the FEIS, Chapter 3, Wildlife, Species Accounts, Marbled Murrelet, pp. 3-195 to 3-196 for a further effects analysis on marbled murrelets.

Comment 4.93 *Please seriously evaluate potential impacts to Great blue heron, which have been observed nesting and are known to use the project area. Helicopters could present a major disturbance, particularly during sensitive life stages.*

The level of analysis in the DEIS is unacceptable. Literally the only analysis is the arbitrary conclusion that "none of the project alternatives are expected to have significant effects on great blue herons because the majority of the heron foraging and nesting habitat is protected under current Standards and Guidelines." (DEIS, p.3-145) This statement is unsupported, and it tells us nothing relevant to making an informed decision between the alternatives.

Response 4.93 There is a low potential for measurable effects to great blue herons. Rookeries are fairly easily observed and if one is found in the project area Forest Plan mitigation will apply. Mitigation measures include: Protecting active great blue heron rookeries with a 600-foot windfirm buffer, where available. Road construction in this buffer is discouraged. Prevent disturbance during the active nesting season (generally March 1 to July 31). The potential effects on great blue herons were analyzed and are found in the project record.

Comment 4.94 *Please seriously evaluate potential impacts to sandhill cranes. Again, helicopter disturbance should be a consideration.*

The DEIS says next to nothing, and offers no support for its conclusion that the project won't impact crane's too much.

Response 4.94 Sandhill crane habitat would not be directly affected as they use marsh wetlands. If a nest is found, Forest Plan direction includes mitigation measures to reduce effects from disturbance. Analysis for these species is found in the project planning record. Mitigation measures include: Conducting activities to avoid or minimize disturbance to habitats within the forest, riparian and estuarine areas which are important to nesting, brooding, rearing and molting for sandhill cranes. The potential effects on sandhill cranes were analyzed and are found in the project record.

Comment 4.95 *Thank you for conducting owl surveys. However, the DEIS fails entirely to evaluate potential effects to owls and other raptors. How much less cavity nesting habitat will there be? What disturbance impacts might there be? The DEIS just says the Forest Plan protects nests, and no nests have been found in units.*

Response 4.95 The Forest Plan contains standards and guidelines that provide for the protection of raptor nests (hawk and owl nests), including a 600-foot buffer around active nests and minimal disturbance during nesting season. No nests were discovered in any of the harvest units proposed under any of the alternatives; however there could have been undetected nests in some of the areas. If nests are detected, Forest Plan Standards and Guidelines would be implemented.

Several of the species (such as pygmy owls and saw whet owls) detected during surveys are cavity nesters. Future snag recruitment would be provided through retention of snags in reserve areas of CCR units; as well as retention of an average of eight large trees per acre in the STS units. Table 3-49 of the FEIS shows POG in the analysis area after implementation of CCR harvesting (NFS lands on Tuxekan Island) shows the amount of suitable POG habitat remaining, by alternative. Based on the protection provided by the standards and guidelines, in combination with the small OGR system on the Island, the project is not expected to have significant impacts on these species. Any nesting pairs that are not discovered prior to project activities may be affected depending on time of year and distance between the nest and activity. Implementation of project activities proposed in all alternatives may adversely impact individuals but are not likely to result in a loss of viability in the Planning Area, not cause a trend toward federal listing.

Comment 4.96 *The DEIS analysis of impacts to goshawks is inadequate. Action alternatives will have unacceptable impacts to goshawks, through lost habitat, fragmentation, and disturbance. Please fully analyze these impacts in the FEIS.*

Please conduct additional goshawk surveys. It is near-impossible to locate goshawk nests, so don't expect Forest Plan nest buffers to protect anything.

What are the "synergistic effects of habitat loss in adjacent areas?" (DEIS, p.3-252)

Response 4.96 Surveys for goshawk nests have been done, as discussed in the FEIS. In addition, there have been additional surveys done in the summer of 2005 to follow-up on sightings in the Nichin Bay area in April 2005. As disclosed in the FEIS, any goshawk nests found would be protected from harvesting and continuous disturbance during the nesting period is not permitted. The analysis of effects has been updated and clarified. The unit cards identify units where additional surveys are needed.

The discussion about "synergistic effects" was not clear and has been dropped.

Comment 4.97 *Goshawks are sensitive to disturbance. Helicopters in particular have the potential to cause major disturbance. Please do not allow helicopter logging during sensitive life stages, or over areas of high-value goshawk habitat.*

Response 4.97 Mitigation to reduce disturbance to nesting goshawks is included if nests are found. This includes disturbance from helicopter activity. There is no provision for avoiding disturbance over all high-value goshawk habitat. It is recognized that there could be effects to nesting pairs if they are not found, but depend on the time of year, and the type and distance between the nest and activity.

Comment 4.98 *The Forest Plan S&G requiring 30% canopy cover is not met by drawing unit lines outside of clearcuts. Goshawks prefer a closed canopy with an open understory, and avoid clearcuts. Please consider the importance of interior old-growth habitat.*

Response 4.98 See Response to Comment 4.14.

The effects of clearcutting with adjacent reserves or deferred areas, along with the rationale for doing so, are disclosed in the FEIS, in the goshawk analysis and in the Silviculture section.

Comment 4.99 *Fragmentation effects of action alternatives, and the adequacy of OGRs to provide goshawk habitat, should be analyzed in the Final EIS.*

Response 4.99 Fragmentation in terms of effects to biodiversity, old growth reserves and connectivity has been evaluated fully and can be found in the *FEIS, Chapter 3, Biodiversity*, pp. 3-77 to 3-99.

Comment 4.100 *It is important that the Forest Service do a comprehensive access management analysis as part of this project. Integrated management of the existing network of roads is a pressing need. The Forest Service is way behind on road maintenance, and has no business building new roads until the old ones are taken care of.*

Response 4.100 See *FEIS, Appendix F, Introduction*. See Tuxekan Island Roads Report (URS 2002d). See updates to Table "Harvesting objectives and practices" for Alternatives 2, 3, 4, and 5. These tables have been updated to include maintenance work done by the Thorne Bay Ranger District between the DEIS and the FEIS. The Tuxekan project area is included the draft POW ATM plan which is a "comprehensive access management analysis". The Tuxekan Access Management plan has been compared with the POW ATM plan and found to have 3 road segments totaling approximately 2 miles that have different management recommendations. The Tuxekan Access Management plan has been updated in the FEIS to be consistent with the POW ATM plan.

Comment 4.101 *The NEPA process so far is not following the Road Management Policy and Final Rule. The DEIS says "the proposed access management plan represents a starting place for discussions regarding road management," when the starting place should have been a science-based transportation analysis. A Roads Analysis is currently being done for the Prince of Wales Island road system, including Tuxekan island, class 1, 2, and 3 roads. That project is currently in scoping, and formal NEPA analysis is expected soon. Please complete this analysis before making any decision to do additional road construction. Selecting one of the action alternatives would commit that analysis to a pre-determined outcome. Implementation of a timber sale with road construction could interfere with road maintenance or obliteration work by occupying available road equipment, crews, and funding.*

Response 4.101 Recommendations from the draft POW ATM plan would be incorporated in the Tuxekan Access Management Plan. The draft POW ATM plan does not include the proposed road construction for the Tuxekan project. All new proposed roads in the Tuxekan project area would be closed upon completion of timber sale operations.

Comment 4.102 *Please consider road management as a significant issue, and obliterate as many roads as are reasonable to obliterate. Unmaintained roads are a hazard to people and wildlife.*

Response 4.102 Road management was addressed by the Tuxekan Access Management plan (see FEIS Table 3-73, Tuxekan Access Management Plan) and is also addressed by the POW ATM plan which includes Tuxekan Island. The effects of past, present, and future road management have been addressed in Chapter 3 under the appropriate resource sections and were found to not be significant. After implementation of the Tuxekan Access Management plan, the amount of open road will be reduced from 36.6 miles to 23.7 miles. The majority of these 23.7 miles of open road have received maintenance work between the DEIS and the FEIS (see Appendix F, Road Maintenance Funding Levels). Based on the information sited above, road management was not considered a significant issue.

Comment 4.103 *Why aren't any alternatives presented regarding road management? The DEIS should have presented some alternatives, which would at least have helped inform an opinion. How can impacts be evaluated, except by comparison with some alternative?*

Response 4.103 All alternatives consider the effects of road management. See *Tuxekan FEIS Chapter 2, Table 2-2 (Comparison of Alternatives)*, Road Management for a description of road construction mileages by alternative. See *FEIS, Chapter 3, Transportation Management*, pp 3-122 to 3-137 for additional information regarding road management.

Comment 4.104 *Road building in the proposed action would have significant, negative effects. Sediment loads will increase. Forest regeneration will be impeded. Water flow will be changed. Wetlands will be filled. Karst will be destroyed. Hunting and trapping access will impact wildlife, recreation and subsistence. Old roads will wash out. Stormproofed roads are only designed to withstand a 25-year storm even.*

The amount of road reconstruction, 31.3 miles under the preferred Alternative, is substantial. Yet road cards don't cover these areas, and DEIS does not seem to consider the effects.

Response 4.104 For effects of roads on soils, water, fisheries, wildlife, karst, recreation, and subsistence, see appropriate resource section in FEIS.

See FEIS Chapter 1 for a discussion of the changed status of road "reconstruction". The 31.3 miles of reconstruction work identified in the DEIS has been reduced to approximately 2 miles of reconstruction work, and 5.8 miles of pre-haul maintenance due to maintenance work performed by the Thorne Bay Ranger District between the DEIS and the FEIS. Roads requiring reconstruction work are included on road cards contained in the FEIS (See Appendix C). The only road requiring reconstruction is the 1470500 road.

It is correct that resource impacts would occur due to road building within the Tuxekan Project Area. Sediment increases would be realized primarily at road/stream crossings. Short term sediment effects would occur where culverts are installed. Long term contributions to sediment supplies would occur during the life of the road prism. Sediment impacts due to project implementation are expected to be limited, due to the location of roads away from stream channels and RMA buffers and implementation of sediment controlling BMPs. Please see the Sediment Yield Section within the hydrology report of the FEIS.

It is true that roads are a permanent commitment of the soil resource, eliminating forest regeneration in that area.

Water flow changes are expected to occur within the project area from implementation of the Tuxekan Project. Water yield changes can affect sediment yield, water quality, karst and cave resources, and aquatic habitat. Roads have been located off high vulnerability karst as much as possible per Forest Plan Standards and Guidelines. The implementation of required BMPs and karst standards and guidelines would minimize impacts to the karst resources. Please see the Water Yield Section of the hydrology report and the Water Quantity section under Karst Resources.

No wetlands would be filled with implementation of the Tuxekan Project.

A portion of the project area roads have undergone maintenance since the DEIS was completed. The remaining road maintenance would be conducted before project implementation occurs. This maintenance would improve road condition within the project area.

Comment 4.105 *Please consider the impact of proposed road construction and maintenance measures on funding available, unmet maintenance needs and the district's deferred maintenance. Building and taking apart roads will add to the already substantial deferred maintenance. Where will sacrifices have to be made, in order to accommodate this timber sale?*

Response 4.105 Determining the priorities for the Thorne Bay Ranger District's spending on deferred maintenance is outside the scope of this project. Much of the roadwork proposed under the Tuxekan FEIS would be funded and performed as part of the timber sale contracts associated with the project.

Comment 4.106 *It is misleading to characterize a road construction project as decreasing roads. It is not true that the cumulative effect of road management is decreased road density.*

Response 4.106 On the Tongass, the demand for roads has been primarily related to the demand for access to timber resources. The maintenance and reconstruction requirements of the existing road system depend mainly on the volume of timber hauled and, to a lesser extent, on recreational use. The amount of future road construction is anticipated to depend largely on the need to access timber resources.

The Tuxekan Island Roads Report (URS 2002d), Appendix F, and the Tuxekan Access Management plan (Table 3-73) contain most of the elements of a roads analysis. An Access and Travel Management plan (ATM) is currently being conducted for Prince of Wales Island that will include the Tuxekan Island project area. The Tuxekan Access Management has been modified to include all of the road management recommendations made in the POW ATM on NFS roads. The POW ATM made recommendations only for existing National Forest System (NFS) roads. Therefore, all new roads proposed, existing NFS roads, and 1.5

miles of unauthorized road within the project area will follow the travel management recommendations identified by the Tuxekan Access Management Plan. For further information regarding the Tuxekan Access Management Plan, see Appendix F of the Tuxekan Island Timber Sale FEIS.

Current total road density (disregarding drivable and non-drivable road characteristics) on NFS land is 2.2 miles per square mile. The current open road density on NFS land is 1.4 miles per square mile. Following the completion of harvest activities, the decommissioning and storage of existing and proposed roads would decrease overall open road density to 0.8 miles per square mile. Because all proposed roads for the Tuxekan Project would be closed following harvest activities, open road density would not change based on project alternative and therefore would remain at 0.9 miles per square mile regardless of the chosen action alternative. See Table 3-70 and Table 3-71 for a display of existing road density and road density by action alternative during project implementation, prior to implementing the Proposed Access Management Plan.

Comment 4.107 *The DEIS plays some fancy tricks with road density data that should be sorted out. Total road density on the island is currently 2.2 mi/sq mi. This is above the level where, for example, unsustainable mortality of wolves is "certain." For purposes of analyzing impacts, the DEIS only counts open roads, which brings the density down to 1.4 mi/sq mi. The proposed action would build another 9.5 miles of road, bringing the total up to 1.76 mi/sq mi. (or 2.5(?) mi/sq mi total.) but only temporarily, until all the new roads, and several miles more besides, would be closed, bringing projected road density down to 0.96 mi/sq mile, just below the Forest Plan standard.*

Also, 63% of the roads you are "closing" are closed anyway. The roads that are undriveable now, that are scheduled to be put into "storage" to decrease open road miles, will have to be opened first, in order to bring in machinery to close the road! The net result is that, in an effort to decrease open road miles, the proposed action would have to increase them in the short term by brushing out roads that had been closed by alder. Meaning peak road density--if all the roads were open at the same time--is more like 2.5 mi/sq mi.!

Roads that are put in storage still have impacts, in several ways. First, storage is not the same as obliteration, and means that a road will be re-used again in the future.

Response 4.107 By closing existing roads that are currently not drivable, few or no impacts are expected regarding access to recreation and subsistence resources due to the lack of motorized use of these roads. Actions on non-NFS lands within the Tuxekan project area are not expected to impact the road system or access to places within the project area. Following harvest activities, open road density for the Tuxekan project area (including non-NFS lands) would change from the existing 1.4 miles per square mile to 0.8 miles per square mile. The current trend is to reduce the mileage of open roads to match available maintenance funds and the needs for protection of other resources. The POW ATM plan is currently being developed, and will address road management for the Craig and Thorne Bay Ranger Districts. The plan includes the Tuxekan project area and will address future road management opportunities such as decommissioning of unauthorized roads. Refer to the *FEIS, Chapter 3, Transportation Management*, pp 3-122 to 3-137 for further information regarding road density.

Comment 4.108 *Second, the forest is not going to come back in the cleared right-of-way. At best, it will remain in early successional stages. In the soils section the DEIS admits this, saying, "The most significant impact on forest productivity would result from the removal of productive areas from re-growth by the construction and development of roads, quarries, landings, and log transfer facilities." (DEIS, p.3-166) When it comes to evaluating impacts to watersheds and wildlife, however, roads are falsely assumed to re-generate into forest. Shot rock roads don't grow back forest, especially if they're re-opened every twenty or thirty years. Please apply soils science to your consideration of impacts to karst, watersheds, silviculture and aquatic habitat.*

Response 4.108 Development of roads, quarries, landings, log transfer facilities and other permanent developments do remove areas from forest production more or less permanently. As permanent facilities, they cannot be expected to also be productive forest.

Based on inspections of temporary roads that have already been constructed and closed, the temporary roads in this project would be expected to revegetate with alder and conifers, especially spruce. It is not known yet what the long-term vegetation on the temporary roads would be, but would it would be expected to be a mix of shrubs and conifers.

Comment 4.109 *Third, closed road crossings of streams typically channelize the water, preventing streams from meandering, increasing sediment flow and current, and altering long-term hydrology.*

Response 4.109 See Tuxekan FEIS Transportation Management section, Travel Management Strategies, Table 3-66. Forest Service Road Management Objectives, (p. 3-130), for the definition of storage. Storage is synonymous with Alaska Forest Resources and Practices Act definition of "closed roads".

The FEIS, Chapter 3, Hydrology, Sediment Yield (p. 19 & p. 37), discloses that decommissioned, or closed roads, do have long-term adverse effects to watershed and hydrology resources. If roads are decommissioned correctly, their drainage structures are removed and natural drainage patterns are restored. Sediment and velocity will not be increased. They will still have impacts, but they should be minimal and much less than closed roads with intact drainage structures. Decommissioned roads were factored into current condition for riparian disturbance, water, and sediment yield.

Comment 4.110 *Fourth, closed roads can still be used, including by motorized traffic, so long as the will is there. Closures are especially meaningless where there aren't major river crossings or bridges to remove.*

Response 4.110 Comment Noted

Comment 4.111 *A new Road Condition Survey is essential. The road crossings situation is a mess. The DEIS says there are 8 Class I and 6 Class II stream crossings currently. The Road Condition Survey lists only 1 Class I and 4 Class II fish stream crossings. The Forest Service has somehow lost nine fish streams. The DEIS also reveals,*

"RCS data is incomplete for several isolated roads and in several locations differences of professional opinion between surveyors are evident. Follow up surveys are scheduled in the summer of 2002 to reconcile the differences between the two surveys." (DEIS, p. 3-154)

Were these 2002 surveys ever done? Where have the missing streams gone? It looks like they might have been found later in the document, in the soils section, where it says "road condition surveys identified 78 stream crossings." (DEIS, p.3-189) Under which assumption of the number of stream crossings are the conclusions about impacts to fish, soils, and karsts based? How can we make informed decisions about road management, when the roads haven't even gotten basic condition surveys (let alone any maintenance).

Response 4.111 Road Condition Surveys are used to identify current road conditions and provide information needed for prioritizing maintenance and improvements. URS stream surveys were completed to identify aquatic resources. The effects of stream crossings on each resource have been analyzed using both the information from the URS stream crossing surveys and the most recent Road Condition Surveys (2005).

The differences between the 2002 URS stream crossing surveys and the 1999 Road Condition Surveys are attributable to differing weather conditions, the inclusion of anecdotal information, use of GIS, incomplete data, and surveyor bias (DEIS). The most recent Road Condition Surveys (2005) were used to analyze the number of culverts in need of repair in the FEIS. The Implementation Team would reassess road work requirements prior to project implementation including stream crossings and drainage structures.

Comment 4.112 *It is unclear whether formerly "temporary," unclassified roads are being considered.*

Response 4.112 "Formerly temporary, unclassified" roads have been considered in regards to total road density on Tuxekan Island. Two sections of unclassified road totaling 0.2 miles have been added to the system under the Tuxekan Access Management plan. These sections show as new classified road in the FEIS since they are currently not on the system. Approximately 1.5 miles of unclassified roads are recommended for decommissioning under the Tuxekan Access Management plan. The remaining existing unclassified roads are not being used for implementation of this project so they are not addressed in the Tuxekan Access Management plan. Future classification determinations on unclassified roads would be done by the Thorne Bay Ranger District.

Comment 4.113 *It is silly to require permits for miners to use roads that are otherwise closed. If roads are open, they are open and should be for everybody. Please don't try to cover for the fact that the Forest Service has built way too much road, by not allowing locals to use them.*

Response 4.113 The first portion of the comment addresses use of 'closed' roads and the requirement of a permit. This comment is not within the scope of the proposed project. The second comment is concerned with the use of 'open' roads. 'Open' roads are available for use by all members of the public.

Comment 4.114 *It is very, very difficult to decipher the intended road management measures without any decent maps. Please include maps in the final.*

Response 4.114 See *Chapter 2: Figure 2-1. Alternative 1 (No Action)* (p. 2-7); *Figure 2-2. Alternative 2* (p. 2-11), *Figure 2-3. Alternative 3* (p. 2-15), *Figure 2-4. Alternative 4* (p. 2-19), and *Figure 2-5. Alternative 5* (p. 2-23).

Comment 4.115 *Please consider the cumulative impacts of the LTF at Nichin Cove. The few sentences in the DEIS (3-259 and 60) regarding the marine environment does not show adequate analysis. What condition is the LTF in? What would the proposed action mean for operation of the LTF?*

Response 4.115 The Tuxekan Project plans to use an existing MAF at Nichin Cove located at the eastern shore of the island. Associated with the MAF is a log sort yard of a few acres. The MAF at Nichin Cove has both a bulkhead and drive-down rock ramp suitable for loading barges. The Thorne Bay Ranger District is planning to perform maintenance to the MAF site under the current permit that will improve barge-loading activities. This work could coincide with timber sale activities, but is not expected to significantly disrupt the use of the facility.

This facility is permitted through ACOE and ADEC and is within permit limits for bark accumulation. The last dive survey performed at the MAF was in 2001. Dive survey results show that no continuous-cover bark exists, and that discontinuous-cover bark is 0.08 acres. It is likely that large timber sale operators will load logs directly onto barges, which will greatly reduce the potential for additional bark accumulation. Some rafting of logs may be necessary during small timber sales to local operators due to the lack of equipment necessary to barge the logs. Due to the small amount of timber available for these sales, the increase in bark accumulation is likely to be minimal.

See *FEIS, Chapter 3: Transportation, Marine Access Facility*, pp. 3-125, and *Fisheries, Marine Water*, pp. 3-216 & 3-217. Copies of the current permits and dive results are included in the project record.

Comment 4.116 *The DEIS says "the determination for the Tuxekan Roads Analysis will be included in the Record of Decision following completion of the Final EIS." (DEIS, p.3-263) That is too late.*

Response 4.116 The Tuxekan Island Roads Report (URS 2002d), Appendix F, and the Tuxekan Access Management plan (Table 3-73) contain most of the elements of a roads analysis. An Access and Travel Management plan (ATM) is currently being conducted for Prince of Wales Island that will include the Tuxekan Island project area. The Tuxekan Access Management has been modified to include all of the road management recommendations made in the POW ATM on NFS roads. The POW ATM made recommendations only for existing National Forest System (NFS) roads. Therefore, all new roads proposed, existing NFS roads, and 1.5 miles of unauthorized road within the project area will follow the travel management recommendations identified by the Tuxekan Access Management Plan. For further information regarding the Tuxekan Access Management Plan, see Appendix F of the Tuxekan Island Timber Sale FEIS.

Comment 4.117 *The DEIS basically ignores the unique requirements of helicopter logging, which will be 18-28 percent of the sale. Helicopters also should be included in the transportation analysis. What are the impacts of helicopters?*

Response 4.117 The Transportation Management analyzes the roads needed to implement the Tuxekan project.

Information of helicopter logging is found in the *FEIS, Chapter 3: Soils, Soil Direct / Indirect Effects*, pp. 3-7 to 3-11; *Karst, Karst Direct/Indirect Effects, Water Quantity Direct / Indirect Effects Common to Alternatives 2, 3, 4, and 5,* p. 3-61; *Issue 2: Timber Sale and Local Economics, Timber Sale and Local Economics Direct / Indirect Effects Common to All Alternatives, Sale Preparation,* p. 3-70 and *Timber Sale and Local Economics Common to Alternatives 2, 3, 4, and 5, Direct and Indirect Effects*, p. 3-71; *Vegetation Management, Vegetation Management Direct and Indirect Effects, Silvicultural Prescriptions*, pp. 3-139 to 3-148; *Wildlife: MIS Accounts, Bald Eagle,* pp 3-188 to 3-192; *Species Accounts, Marbled Murrelet,* pp. 3-195 to 3-196; *Fisheries, Fisheries Direct / Indirect Effects Common to Alternatives 2, 3, 4 and 5, Windthrow/Windfirm Buffers,* p. 3- 210.

Comment 4.118 *We are concerned that helicopters will have major impacts to wildlife. Of particular concern are disturbance effects to birds, especially goshawks, marbled murrelets and eagles, especially during nesting and other sensitive life stages. Helicopter disturbance and damage to residual trees will be made worse because helicopter yarding is being done in STS units. Any, for example, murrelet nests in the stand would probably be destroyed. There is abundant literature, and tools available to quantify probably effects.*

Response 4.118 The potential effects of helicopter logging on goshawks, murrelets, eagles and residual trees are discussed in the FEIS.

There are no confirmed goshawk nesting sites in the Tuxekan project area. However, goshawks are extremely difficult to locate, and it is possible that the project area includes breeding territories. Activities associated with road work or timber harvesting could cause disturbance to nesting goshawks. Any goshawk nests found during additional follow-up surveys and field reconnaissance or unit layout would be protected from harvesting by implementing Forest Plan Standards and Guidelines for goshawks.

for effects or mitigation measures regarding helicopter logging on bald eagle and marbled murrelet,. see the *FEIS Chapter 3, Wildlife: MIS Accounts, Bald Eagle Direct / Indirect Effects*, pp. 3-191 & 3-192; *Species Accounts, Marbled Murrelet Direct / Indirect Effects*, p.3-196

Comment 4.119 *Helicopter prescriptions also have significant impacts on project economics and availability of timber to small operators, because helicopters are so expensive, and because helicopter logging companies generally bring in their own crews. Please consider these impacts in and EIS.*

Response 4.119 The NEPA Economic Analysis Tool (NEAT) used to evaluate the economics of each alternative incorporated the varying costs of the logging systems proposed, including helicopter logging. The details of the NEAT analysis are located in the project record and are summarized in *FEIS, Chapter 3, Issue 2: Timber Sale and Local Economics, Methodology*, p. 3-36.

Small sale opportunities appropriate for small operators are identified under each alternative (2.7 MMBF under Alternatives 2 and 3, 1.8 MMBF under Alternative 4, and 1.7 MMBF under Alternative 5). This is discussed in *FEIS, Chapter 3, Issue 2: Timber Sale and Local Economics, Large and Small Sale Opportunities*, pp. 3-75 & 3-76.

Comment 4.120 *It is unclear whether commercial and pre-commercial thinning is planned for past, present or future units. We would support pre-commercial and commercial thinning projects on the island. Why aren't thinning alternatives being evaluated?*

Response 4.120 There are no reasonably foreseeable future timber sales on either federal or non-federal lands. There have been approximately 2,145 acres of precommercial thinning. Current precommercial thinning plans (King Tux) are to thin 1,291 acres of second growth. See *FEIS, Chapter 3, Vegetation Management, Vegetation Management Cumulative Effects, Vegetation Management Cumulative Effects, Future Activities*, p. 3-157.

Comment 4.121 *In Table 3-37 units have windthrow potential ranging from moderate, to high, to very high, to extreme. What are the meanings of these terms? Given that the middle of this range is "high," it is obvious that there will be problems with windthrow of leave trees, buffers and old-growth reserves. Road and unit cards reveal that reserve areas will commonly be left exposed to windthrow. However, the DEIS wants to wait until unit layout to ensure that buffers are windfirm. As stated above, we are concerned that reserve areas will blow down, and not provide the habitat features (e.g. canopy cover, connectivity) required by the Forest Plan.*

Response 4.121 The DEIS discusses windthrow hazard, based on qualitative analysis (see Windthrow Analysis for the Kosciusko and Tuxekan Project Areas Tongass National Forest (Mason, Bruce & Girard (MBG). 2001) The terms "moderate, high, very high and extreme" are relative terms which serve to rank areas with respect to windthrow potential. Given the high potentials for wind damage, CCR prescriptions were applied for most stands. CCR prescriptions reduce wind hazard in the treated portions of stands, and reduce wind effects in the intact old growth portions that are unharvested for other resource considerations. There is no guarantee of windfirmness, but these steps minimize the hazard to levels that can be reasonably assured. These determinations are judgments based on all available factors.

Comment 4.122 *Single-tree selection virtually ensures highgrading the biggest, best trees off the island. What steps are being taken to prevent this?*

Response 4.122 Single tree selection prescriptions are developed for each individual unit. With managements objectives in full view, prescriptions are developed that meet those objectives using silviculturally appropriate methods, and prescribe the removal of trees that meet specific conditions (species, size, disease, damage, inter-tree spacing, value, etc). Single tree selection, as a silvicultural method, therefore does not "ensure highgrading". However, some stands contain high-value timber that can be harvested with appropriate methods, specifically to add economic value to the overall project. There are no attempts made to prevent this, in fact, steps were taken to seek opportunities to increase the overall sale value.

Comment 4.123 *It is worth noting that it takes centuries for old-growth hemlock stands to develop. The 100-year rotation in the Forest Plan will not allow for anything like old-growth to re-establish.*

Response 4.123 Both these statements are true. However, in timber management LUDs the objectives of management do not include re-creation of old-growth conditions on sites managed for increased production.

Comment 4.124 *Cumulative effects to subsistence are significant. Thank you for considering this critical issue, and for taking some initiative to contact subsistence users. Those efforts are dated, and a new, thorough subsistence analysis should be done.*

Response 4.124 The analysis of subsistence uses has been reviewed and updated based on current harvest data available from the Alaska Department of Fish and Game. Estimated habitat capability has been revised to account for wolf predation. The analysis is discussed in Chapter 3 of the Final EIS under Subsistence.

Comment 4.125 *Impacts to deer populations, particularly the risk of a major collapse following a deep snow winter, should be considered in the context of subsistence.*

Response 4.125 Impacts to subsistence have been considered in the *FEIS, Chapter 3, Issue 3 – Wildlife, Deer Habitat and Subsistence Use*, pp. 3-99 to 3-122).

Comment 4.126 *Impacts to fish should be considered in the context of subsistence. If salmon became less abundant here, would anybody suffer?*

Response 4.126 According to the 1988 TRUCS inventory, communities using the Tuxekan project area for subsistence are Edna Bay, Craig, Hydaburg, Ketchikan, Klawock, Meyers Chuck, Petersburg, Saxman, Thorne Bay, and Wrangell. Declines in populations of fish could reduce their subsistence opportunities.

However, significant direct and indirect effects to water quality, aquatic habitat, salmonid spawning gravel or populations of fish are not expected to result from implementation of the action alternatives associated with the Tuxekan Island timber sales.

Stream buffers, application of wind firm buffers on specific units, avoidance of steep/unstable slopes and road construction and stream crossing mitigation measures are expected to minimize negative direct, indirect and cumulative effects to a point where impacts to spawning gravel and salmonid production would not be detectable relative to background conditions.

Comment 4.127 *Thank you for thoughtfully considering these comments. Please notify us of any future project developments, and send a paper copy of the final EIS and ROD, if that becomes available.*

Response 4.127 Comment Noted

Corrie Bosman

Comment 5.1 *The following are the official comments of the Sitka Conservation Society, Greenpeace and the Juneau Group of the Sierra Club, submitted jointly, regarding the Tuxekan Island Timber Sale Draft Environmental Impact Statement (DEIS). We are sending these by both electronic and postal mail.*

Response 5.1 Comment Noted

Comment 5.2 ***The Purpose And Need Statement For This Sale Is Unjustified.***

The purpose and need behind the Tuxekan Project is "to respond to the goals and objectives of the Forest Plan and to help fulfill the desired future conditions described in that plan" DEIS S-2. The only further information provided regarding the purpose and need is the forest-wide goals and objectives for the land-use designations within the project area. The section is devoid of any site-specific information as to why this project is needed in this area at this time. We have been very involved with various timber sales and other projects on the Tongass National Forest, and do not recall ever seeing such a broad purpose and need statement, clearly not driven by site-specific information.

Response 5.2 Based on the goals, objectives, and desired condition for the Timber Production and Old-growth Habitat LUDs, the following needs have been identified to move the Tuxekan Project Area towards the Forest Plan desired condition.

- Manage the timber resource for production of sawtimber and other wood products from suitable timber lands made available for timber harvest on an even-flow, long-term, sustained-yield basis and in an economically efficient manner.
- Seek to provide a timber supply sufficient to meet the annual market demand for Tongass timber and the market demand for the planning cycle.
- Provide a diversity of opportunities for resource uses that contribute to the local and regional economies of Southeast Alaska.
- Support a wide range of natural resource employment opportunities within Southeast Alaska's communities.
- Maintain a Forest-wide system of old-growth forest habitat to sustain old-growth-associated species and resources and ensure that the reserve system meets the minimum size, spacing, and composition criteria.

Appendix A provides information on how this project relates to the overall proposed Tongass timber sale program and why the project is being scheduled at this time. For further information, see the *FEIS, Chapter 1, Purpose & Need*, pp. 1-15 to 1-16.

Comment 5.3 ***Reliance On Timber Volume From This Project To Meet Annual Market Demand Is Arbitrary And Violates NFMA, TTRA, and NEPA.***

Appendix A of the DEIS explains this project is being driven in part by the need to meet perceived market demand for Tongass timber. The demand considered by

the Forest Service is based on planning cycle projections made in 1997 by Forest Service economists David Brooks and Richard Haynes (See DEIS Appendix A; Brooks and Haynes 1997).

Similarly, the Forest Service relies on the Brooks and Haynes projections in determining how much timber to offer for sale each year. That annual calculation depends on a variety of factors that vary from year to year, including mill capacity, utilization, percent usable wood, volume under contract, lead time between contracting and logging, and other variables. See Responding to the Market Demand for Timber, April 2000 at 12-30. It has the central goal of supplying enough timber to meet the "harvest projections" forecast by Brooks and Haynes. Id. at 28 ("the procedures incorporate harvest projections for the coming year …. Harvest projections developed by the PNW Research Station [Brooks and Haynes] will be used here…."); see also id. at 8-10 (explaining the projections and describing them as "Ten-Year Harvest Projections"). Moreover, these logging level estimates form the basis for the Forest Service's "Gate System" because they are used to determine how much timber should remain in the various "pools."

Thus, the Brooks and Haynes projections are central to meeting the demand over the planning cycle and in the annual calculations made to determine timber offerings. Nonetheless, the Forest Service has not updated the projections to reflect changed market conditions. While the Brooks and Haynes report provided the best estimates of market demand available in 1997, changing circumstances in the intervening years have proven even the lowest of these estimates to be too high. Since 2000, when the last timber was cut pursuant to the long-term contracts and KPC Settlement, the average cut from the Tongass has been about 44 MMBF/year, less than half of the "low" scenario projected by Brooks and Haynes. The lower logging levels are one indication of this market decline. In addition, prices for Tongass timber have declined dramatically since the highs of the mid-90s. See 2003 Wilderness FSEIS at 3-253 ("Prices for all of the species harvested on the Tongass have declined considerably over the last five years.").

The Forest Service has recognized the extent and severity of the market decline. Indeed, persistent depressed market conditions led the Forest Service to grant extensions of up to three years for contracts awarded after January 1, 1997, and later to offer to cancel twenty contracts outright. The market downturn results in large part from two changed circumstances that contradict explicit assumptions made by Brooks and Haynes: Japan is importing less wood from Alaska and North America than Brooks and Haynes assumed; and, contrary to predictions, no new market has developed for the low grade Tongass wood that used to go to the pulp mills.

In the 2003 Wilderness FSEIS, the Forest Service acknowledged "a number of differences between Brooks and Haynes' (1997) assumptions and actual conditions in 2000." 2003 Wilderness FSEIS at 3- 287. Specifically, "Brooks and Haynes assumed, for example, that North America's share of Japanese softwood lumber imports would range from 70 to 76 percent, depending on their scenario. North America accounted for just 61 percent of Japanese softwood lumber imports in 1999." Id. at 3-287 to 288; see also id. at 3-253 ("The value of [Tongass timber exports to Japan] has declined by more than half over the last five years.").

The second assumption that did not materialize was that, following the closure of the Alaska pulp mills, new markets would be found for the low-grade timber. See

Brooks and Haynes at 4 ("For these revised scenarios, we assumed that alternative markets, either export or domestic, can be developed for chips, low-grade saw logs, and utility grade logs. In the absence of markets, low-grade sawlogs and utility logs may be left as logging residues."); Forest Plan FEIS at M-6 ("All the projections assume that lower grade material that was previously directed to pulp production, including the low-grade saw timber previously directed to the KPC pulp mill, can be exported."). The Forest Service acknowledged in the 2003 Wilderness SEIS that this projection did not pan out: "While these data indicate that a market existed for chips in 2000, this is no longer the case." See 2003 Wilderness FSEIS ay 3-252 to 253. Instead, "timber sales on the Tongass now include an Optional Removal clause … that allows sale purchasers to leave behind utility logs. These logs still have to be purchased as part of the timber sale but the purchaser no longer has to remove them, saving on logging and haul costs." See Id. at 3-253.

While Brooks and Haynes did contemplate that the residues could be left on site, the lack of a market for chipped logs does have a direct and significant effect on the economics of and demand for logging. "[T]he loss of the market for wood chips has important implications for the economic viability of timber sales on the Tongass. … The lack of a market for chips also has resulted in an increase in applications to export low grade round Sitka spruce and hemlock logs harvested on the Tongass." Id. 3

World timber markets, including the Japanese, have declined. The DEIS, however, does not relate these declines to its logging level projections or in any way explain its continued reliance on projections that have proven inaccurate and whose underlying assumptions have been disproven. That failure violates NEPA. For further explanation of these issues, see the Plaintiff's briefing in Natural Resources Defense Council, et al. v. United States Forest Service, et al., No. J03-029 CV (JKS) (D. Alaska) (filed Dec. 9, 2003), which is incorporated by reference here..

Response 5.3

The Forest Service monitors market demand for Tongass timber in a number of ways. Market demand is tracked and reported annually in the Timber Supply and Demand report prepared pursuant to Section 706(a) of ANILCA. In addition to the 706(a) reports, the market demand forecast for Tongass timber (Morse, April 2000) is the Alaska Region's response to Congressional direction in Section 101 of the 1990 Tongass Timber Reform Act (TTRA).

Subject to appropriations and applicable law, including the National Forest Management Act, section 101 of the TTRA directs the Secretary of Agriculture, to the extent consistent with providing for multiple use and sustained yield of all renewable resources, to "seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle." The methodology outlined in Morse is used to set the TTRA goals for the Tongass timber sale program – it is the projected volume needed to meet market demand. The commenter contends that use of the Morse methodology for use in seeking to meet market demand is inappropriate because the Morse methodology includes figures taken from the projections made by Brooks and Haynes in 1997. The commenter notes that actual harvesting since 2001 has been significantly below the harvesting level projected by Brooks and Haynes. The Forest Service believes that the Morse methodology remains a reasonable and permissible means for gauging the market demand for timber. The Morse methodology does use the Brooks and Haynes projections in one line of its calculations, but Morse

emphasized the uncertainty inherent in predicting the future demand for Tongass timber. Her methodology is based on very different factors than those used by Brooks and Haynes, including mill capacity, utilization, volume under contract and others. In addition, the methodology is self-correcting based on actual experience. To the extent that actual harvesting is lower than projected harvest, the inventory of timber under contract builds up and the demand for new timber decreases. Morse also pointed out that in terms of short-term economic consequences, over-supplying the market is less damaging than under-supplying it. If more timber is offered than purchased in a given year, the unsold volume is still available for re-offer in future years. The unsold volume would have no environmental effects. Conversely, a shortfall in the supply of timber available for harvesting in a given year can be financially devastating to the industry. During low points in the market cycle, timber sale purchases tend to increase before markets recover. Morse also advised the agency to consider the likelihood of delays from administrative appeals and litigation when planning its timber program.

In 1998 through 2000, actual harvesting exceeded the Brooks and Haynes projections. During the following three years actual harvesting was less than projected. Timber demand is volatile Given the self-correcting nature of the Morse methodology, the relatively short period in which harvesting has been below the Brooks and Hayes projections, and the impact that litigation, injunctions and other factors have had on the ability of industry to purchase and harvesting timber during that period, the Forest Service continues to believe that the Morse methodology is reasonable and that the Tuxekan sale is an important component in the goal of the timber sale program to seek to meet market demand.

Comment 5.4

A principal basis for the ASQ selected by the Alaska Regional Forester in the 1997 Tongass Plan was the volume of timber estimated as needed to satisfy the projections of market demand for Tongass timber over the planning cycle. See ROD for 1997 Tongass Plan at 25. These projections were based upon a draft report projecting market demand prepared by Pacific Northwest Station economists Brooks and Haynes. This draft report projected a market demand ranging from a low scenario averaging 68 mmbf/year to a high scenario averaging 154 mmbf/year.

The ROD for the 1997 Tongass Plan states that the demand projections contained in that draft are "for sawlogs suitable for producing lumber in Southeast Alaska mills." See ROD for 1997 Tongass Plan at 25. This statement is incorrect. In fact, the projections encompassed both sawlogs and utility logs. This error led to an assumption in the Tongass Plan decision that an annual logging level of between 130 mmbf and 296 mmbf would be needed to satisfy the projections in the May 15 Brooks and Haynes draft. Id.
In adopting a plan, the Regional Forester was, among other things, seeking to provide sufficient timber to meet market demand for the planning cycle, under 16 U.S.C. § 539d. The erroneous interpretation of the May 15 Brooks and Haynes draft caused the Regional Forester to seek to provide a supply of timber that was significantly higher than the actual Brooks and Haynes projections. In so doing, the Forest Service allocated significantly more land for timber production than was necessary to meet the Brooks and Haynes projected market demand.

By using this erroneous interpretation to justify an ASQ that is nearly double the actual projections of market demand, the 1997 Tongass Plan allocated more land than necessary to logging. As a result, other multiple use objectives for National Forest lands in the area, such as customary and traditional uses of wildlife and

other resources, are unnecessarily harmed in violation of the agency's obligations under NFMA. See 16 U.S.C. § 1604(e)(1), (2).

Given that the ASQ adopted in the 1997 Tongass Plan is based on an erroneous interpretation, the Forest Service's decision to adopt the 1997 Tongass Plan was arbitrary and violated the multiple use principles of the NFMA. Thus, any project-level decision, such as Tuxekan, that "conforms" to that decision is also arbitrary and violates the principles of sound management mandated by the NFMA and TTRA.

Response 5.4 This focus of this comment is on ASQ market demand and LUD allocations in the Forest Plan, and is not specific to the Tuxekan Timber Sale project. This comment is more appropriately addressed at the Forest level, and therefore is beyond the scope of this project. Appendix A includes discussion on market demand as well.

Comment 5.5 *We must also point out that according to the 1997 Forest Plan Record of Decision, "standards and guidelines take precedence over annual targets or projected outputs; no project or program will be funded for which the applicable standards and guidelines cannot be carried out." (Forest Plan ROD, 1997, p.3) Further the Forest Plan FEIS states: "If any conflict should arise between meeting a standard or guideline, and achieving a particular output objective such as level of timber harvest, the standards and guidelines will take precedence." (Forest Plan FEIS, 1997, L-65) In many respects, the Tuxekan project, as presently planned, will fail to satisfy many Forest Plan standards and guidelines, as discussed elsewhere in these comments, in an attempt to reach the timber target in the project's purpose and need. This is not legal.*

Response 5.5 Forest Plan wildlife standards and guidelines have been incorporated and are being met as discussed throughout the FEIS. The Tuxekan Project meets Forest Plan direction with the exception of the Interagency Committee old-growth reserves. Implementing the selected alternative will require a non-significant Forest Plan amendment. See Appendix 4 - Non-Significant Forest Plan Amendment.

Comment 5.6 *Lastly, we are very disturbed about the fact that the Forest Service is moving forward with this project given that the net stumpage rate is negative for all alternatives. The only way to bring this sale into the positive is to export western red cedar. Reliance on cedar export removes job from southeast Alaska (which the DEIS is relying on in part to push this project forward) and result in high-grading the most valuable trees. This later issue is discussed elsewhere in these comments.*

Response 5.6 The analysis of timber sale financial efficiency is intended to isolate and evaluate those costing centers that may influence a timber sale's economic risk: the economic cost/tradeoffs associated, a project's stability through time in differing economic conditions, and other logical harvesting groupings.

The analysis of Issue 2: Timber Supply and Economics section in Chapter 3 of the FEIS describes the economics of the timber sales alternatives. While it is not possible to predict the economic environment for the future date at which the timber sale could occur, revised volume estimates and changed market conditions now indicate that the estimated bid value is positive under all action alternatives considered. While it is not possible to predict the economic environment for the future date at which the timber sale could occur, if the sale appraised deficit at the

time of offer, management options could be applied to improve the economics or the sale could be delayed until market conditions improve.

The approval of red cedar exports would be based on inadequate local market demand. Although the export of red cedar would reduce the number of jobs potentially supported in the local economy within the sawmill sector, jobs would still be supported in the logging sector.

Additionally, Alternative 5 was developed to address the issue of timber sale economics. The effects of this alternative are discussed in *Chapter 3 under Issue 2: Timber Supply and Economics: Timber Sale and Local Economics Common to Alternatives 2, 3, 4, and 5 Direct and Indirect Effects*, pp. 3-70 to 3-74, and *Timber Sale and Local Economics Cumulative Effects Common to Alternatives 2, 3, 4, and 5*, pp. 3-75 to 3-76.

Comment 5.7

The Tongass is a naturally fragmented ecosystem. This natural fragmentation has been drastically exacerbated by anthropogenic factors, primarily logging and road construction. Highly fragmented habitat may provide little or no benefit for many wildlife species (Suring et al 1996). Indeed, many terrestrial species are negatively affected by fragmentation of their natural habitat. Protection of biodiversity and wildlife viability is one of the critical reasons for protecting very large expanses of forest.

> *"In naturally fragmented landscapes, such as the Tongass, there are heightened concerns regarding fragmentation, isolation of populations, and local population extinctions. Under these conditions, unroaded areas may play a critical role in maintaining ecosystem health...Because ecosystems in SE Alaska are naturally fragmented, the loss of roadless area conditions may pose a high risk to species existence and persistence…." (USFS 2003)*

Habitat fragmentation is a critical issue for wildlife populations in the Tongass because of the natural fragmentation of the landscape and because the forest has been further fragmented by over 5,000 miles of roads. Because ecosystems in naturally fragmented landscapes are less resilient to further fragmentation, logging poses a higher risk to species existence and persistence.

Response 5.7

Additional analysis of the direct, indirect and cumulative effects of fragmentation on habitat connectivity has been included in the *FEIS, Chapter 3, Issue 3 – Wildlife, Habitat Connectivity Direct / Indirect Effects (measure 3aW3)* and B*iodiversity Cumulative Effects*, pp. 3-94 to 3-99

Comment 5.8

Tuxekan Island is one of the most heavily logged and roaded areas of the Tongass National Forest. Logging began in the Project Area in the 1920's. To date 7,779 acres have been logged almost entirely by clearcutting and not employing the standards and guidelines of the current Forest Plan to protect sensitive resources. (DEIS 1-10) Further, much of the historical logging on the island targeted TimTyp's higher Volume Class stands that provide the best wildlife habitat. We are disturbed to see that many of the harvest units are adjacent to areas that have already been heavily fragmented due to past logging, worsening the fragmentation problem. The Forest Service's preferred alternative will result in the greatest increase in fragmentation.

Response 5.8

See response to Comment 5.7.

Comment 5.9 *The Tuxekan DEIS and associated wildlife reports do not include a fragmentation analysis. The paragraph and table in the "Forest Fragmentation" section of the DEIS (p.3-131) are brief, misguided, and do not address the subject. The statement that "... forest fragmentation can be analyzed in terms of average harvest unit size and total harvest" and the shallowness of this section (we cannot call it an analysis) demonstrate a lack of professional competence on the subject. Analysis of habitat fragmentation is, of necessity, an exercise involving the size of forest patches (not unit size), their suitability as habitat (e.g. amount of interior habitat), and their juxtaposition, connectedness and accessibility for various species. We request that a thorough fragmentation analysis be done for the province, similar to the Southeast Chichagof Landscape Analysis completed by the Chatham Area, and that its findings be made available to the public prior to any continued planning on this project.*

Response 5.9 Additional analysis of the direct, indirect and cumulative effects of fragmentation on habitat connectivity has been included in the FEIS. The old growth habitat strategy, which was used in developing the Forest Plan, has been incorporated into this project. This includes the old growth reserves, as well as the standards and guidelines for management of matrix, and incorporation of beach or estuary buffers and riparian buffers. The Forest Plan does not require maintenance of landscape connectivity between small OGRs, but because of extensive past harvesting on the island, connectivity was incorporated into developing the alternatives, and is addressed in the analysis. These measures were used to assure that the project was meeting Forest Plan Standards and Guidelines and the Conservation Strategy, which were designed to maintain species population viability.

Comment 5.10 *The DEIS fails to provide adequate information relating to stand composition. We believe that either unit locations have been gerrymandered or the project area has been selected in ways that target forest stands that can produce high yield and high economic value, but that also are rare and have high wildlife value. This includes yellow and red cedar as well as high Volume Class spruce and hemlock stands. The DEIS makes its clear that the high volume stands (TimTyp volume classes 6 and 7) are being disproportionately targeted for removal in relation to their existence within the project area. Originally this project intended to log 20 mmbf from 2,100 acres; at present project intends to log nearly the same amount, 18.9 mmbf, from only about one-quarter original acreage, 573 acres. The fact that this project must be focused on rare remaining high wildlife value stands is apparent from those statistics. It is also clear that past logging in the area has already substantially removed the lower elevation stands of big trees. Of the 7,779 acres that have been harvested, 6,753 acres were between 0-500 feet. (Tuxekan Wildlife Report)*

Response 5.10 The project area and units within the project area were in fact selected because they provide high yield (both now and potentially in the future) and high value. This is logical in timber LUDs. To do otherwise could jeopardize the timber sale's financial viability. The Forest plan does not require proportionality of harvesting through the range of volume strata or volume classes in any given project.

Additional analysis has shown that the reserve/deferred areas are largely composed of high volume strata (more than 86%) while the remainder is largely low or moderate volume productive old growth. Table "Silvicultural harvesting

methods" in the goshawk analysis shows the reserved/deferred acres in comparison to acres of STS or CCR harvest acres.

Additional analysis has been incorporated to address the effects of road construction in "reserved" areas. It is recognized that road corridors through reserve or deferred areas would not contribute to meeting the goshawk and marten standards and guidelines. Because of the small acreage involved, this would be addressed during unit layout and is shown on the unit cards where appropriate.

Comment 5.11 ***Adequate Old-Growth Reserves Are Not Provided***.

We are very concerned about the proposed design of the Old-Growth Reserves on Tuxekan Island under the proposed alternative. As mapped in the Forest Plan the majority of lands set aside as Old-Growth Reserve are of poor habitat quality containing low to medium-volume forest, non-commercial scrub forest, non-forested muskeg, and linear beach and riparian buffers, rather than the circular blocks that provide interior forest conditions, as specified by the Forest Plan. Rather than correct these inadequacies, the USFS is proposing reserves that focus primarily on low to moderate productivity forestland that is of limited value to old-growth dependent wildlife populations. These new reserves provide the minimum acreage required, but ignore habitat quality in favor of increased timber production. This flies in the face of the recommendations of the interagency biologists brought together to review the reserves system on Tuxekan Island. The reserve design recommended by the interagency biologists meets the intended purpose of the reserves, which includes protecting the largest remaining block of high-volume (in terms of TimTyp Volume Classes), low elevation un-fragmented old-growth forest on the northwestern tip of Tuxekan Island, in the vicinity of Skookumchuck Passage. We request, should planning continue on this project, that the recommendations of the interagency biologists (May 2002 report) regarding

Response 5.11 See Response to Comment 1.3.

Comment 5.12 *The Tuxekan Project Fails To Protect Wildlife Corridors and Connectivity.*

The Forest Plan recognizes the importance of protecting wildlife corridors and specifically requires a review of landscape connectivity. This includes specific direction to provide stands of productive old growth as corridors where existing corridors are insufficient (Forest Plan 4-120). The 1998 Forest Plan Implementation Directive also requires an evaluation of landscape connectivity and beach fringe connectivity. It specifically requires the Forest Service to work with ADF&G and USFWS to consider maintaining additional habitat during project-level analyses and to provide for designation of additional corridors in some situations. Given the impact of past logging on the beach and riparian areas of the Tuxekan Project area, this is exactly the type of situation envisioned by Forest Plan and the 1998 Directive.

Rather than do this, the Tuxekan DEIS preferred alternative allows for logging and road construction right through the few wildlife corridors that exist in the project area. We are especially concerned about the east west stream corridors at Karheen Creek, the north-south corridor at the north fork of the Karheen Creek, and the two east-west corridors near Scott Lagoon. The preferred alternative allows for harvest of units located in each of these wildlife corridors.

The Tuxekan Project clearly falls short of providing adequate wildlife corridors. As discussed above, the project area has already undergone extensive habitat modification from past logging activities. The result is that much of the project area does not have the mature beach fringe that the USFS tends to rely upon to serve as wildlife corridors. Additionally, logging has compromised miles of streams in the project area. This past logging was done under a very different set of standards and guidelines than the current 1997 Forest Plan. Furthermore, portions of the beach fringe and streams in the Project Area occur on private lands. Since these lands are not under the control of the USFS, there is no guarantee that any mature beach fringe that may exist on these lands today will not be logged in the future-eliminating use of these areas as wildlife corridors. It therefore would be inappropriate for the project to rely upon these areas to provide landscape connectivity critical to wildlife in the area.

The DEIS does a poor job of analyzing wildlife corridors and connectivity issues including those between the OGRs and the remaining corridors of high-volume old growth timber. For this reason, please provide the public with a detailed analysis of wildlife corridors and connectivity in relation to this project in the FEIS. Should the Forest Service move forward with planning on this project, we request that the corridors displayed in the DEIS (fig. 2-2) be dropped from any consideration for harvest or road construction.

Response 5.12 Discussion of wildlife corridors and connectivity has been updated and is found in the *Chapter 3, Issue 3 – Wildlife, Biodiversity,* pp. 3-79 to 3-99. The Forest Plan does not require maintenance of landscape connectivity between small OGRs, but because of extensive past harvesting on the island (in riparian areas and beach fringe), connectivity was incorporated into developing the alternatives, and is addressed in the analysis.

Comment 5.13 *Forest Service Modeling of Impacts on Deer & Wolves is Grossly in Error.*

There are several very fundamental problems with how effects of the project were estimated concerning future deer numbers, subsistence and sport hunting, and effects on wolves. Analyses of these issues all rest on how the project's effects on deer have been modeled. Analyses for the issues mentioned are core components of the NEPA process for the Tuxekan project. Because (as explained below) those analyses are meritless as a consequence of fundamental problems with the Forest Service deer model, correction of the deer model and issuance of a Supplemental DEIS for this project will be necessary if the project is to proceed.

The most basic problem is that because deer in the project area are preyed-upon by wolves, the simplistic technique employed of modeling deer as a single, isolated species does not work. Deer habitat, the deer population, and the dynamic interaction of deer and wolves must be modeled together in order to realistically estimate the effect of the project on deer and human uses of deer. This is clearly stated on page 59 of Person (2001) which criticizes, for areas where wolves prey on deer (such as Tuxekan Island), application of the Forest Service deer model as a stand-alone model to predict impacts of logging on the supply of deer for subsistence:

> *"To use the model for that purpose, an assumption of a linear relation between changes in habitat suitability and deer populations is necessary. Our work challenges that assumption and suggests changes in productivity of habitats to support deer will have disproportionate effects on deer populations where predation by wolves is a factor.* ***We emphasize the need to***

examine *the effects of timber harvest, or any other disturbance of the system**, at the community level rather than for only individual species**. Modeling the wolf-deer system, as we have done, is better suited for assessing effects of forest management on deer populations than simple habitat suitability models." (Person (2001), p.59, all emphasis added.)*

(We note that Person (2001) was cited in the Tuxekan DEIS; however, it appears that review of the document was not thorough and that the above point was not considered by the planning team. Also not that Person's method applies a deer population model and a wolf/deer equilibrium model to the results of the Forest Service deer model.)

Response 5.13 The use of the deer model is for purposes of comparing alternatives and is not used to predict absolute numbers of deer. The use of the deer model is established by the Forest Plan. To change its application would require a Forest Plan amendment and is beyond the scope of this site-specific project.

Current direction for the deer model is to not apply the wolf-induced predation reduction to deer habitat scores when estimating deer available to wolves. The predation reduction is applied when discussing deer available to humans.

Comment 5.14 *Another basic problem is that regardless of which modeling method is used (single-species modeling as in the Tuxekan DEIS or community modeling as recommended by Person), the Forest Service deer model is at the core of the analysis. The Forest Service deer model is, however, flawed to the point of being useless because it is based on a dataset of forest characteristics that has no correlation to habitat characteristics. (Caouette et al. (2000)). In addition, the model has never been verified. Any NEPA analysis that relies on the Forest Service deer model is accordingly worse than useless it is dangerous because it is guaranteed to be provide incorrect or, at best, highly unreliable information.*

Response 5.14 See Response to Comment 5.13.

The Forest recognizes that there were problems with the validity of the old growth information used in models used during the Forest Planning process. New vegetative mapping efforts are underway that should be beneficial for improving the performance of wildlife habitat capability models (Forest Plan 5-year Review, 12/04).

Comment 5.15 ***Specifics of Why the Forest Service Deer Modeling Is Invalid****.*

This section addresses only the Forest Service deer model (a habitat capability model). Understand that although we do not discuss other levels of modeling here, we believe it is necessary to use the other levels of modeling recommend in Person (2001) in concert with a deer habitat capability model. We believe the deer model over estimates current deer habitat capability and under estimates impacts on deer.

The deer model used in this project, the 1997 Forest Plan deer model, is invalid for the two reasons discussed below. The model uses the Volume Strata forest classification dataset. This dataset was created for the 1997 Forest Plan revision, and it ranks productive forest into classes of High, Medium and Low timber density (board feet per acre), irrespective of tree size.

Also, the Tuxekan DEIS falsely and very misleadingly identified the model used for the project as an "interagency model." (DEIS 3-134, last paragraph.) Although the Forest Service has claimed for years that the 1997 model is an interagency model, the claim is false, as we will show later. The only interagency deer model that has ever been used on the Tongass National Forest is the Suring et al. 1992 model. The Suring model is a quite different model from the 1997 deer model because it relies on the TimTyp (Volume Class) dataset rather than the Volume Strata dataset. We also note that the Tuxekan project's Wildlife Resource Report (April 2002) erroneously refers to the model employed as the 1992 Suring model. (p.16) The implied validity of the model, achieved by calling it an interagency model or the Suring model, is false. The model has in fact not been endorsed, nor has it ever been validated.

THE FIRST REASON THE 1997 MODEL IS INVALID: The Volume Strata forest classification dataset that was used in the 1997 deer model is not appropriate for use in a habitat capability model. Instead of using that model, the Tuxekan project should have employed a model (such as the Suring model) that uses the TimTyp dataset. The volume strata dataset was devised expressly for inventorying timber volume, not wildlife habitat. In fact, it has been found that the Volume Strata dataset's forest classifications have no correlation to old-growth habitat characteristics, such as tree size and crown structure, and therefore it is unacceptable for inventorying such habitat. (See "Deconstructing the Timber Volume Paradigm in Management of the Tongass National Forest," Caouette, Kramer & Nowacki, USFS PNW-GTR-482, March 2000.)

A deer model like the 1997 Forest Plan model (that is, one that is based on a forest classification dataset that bears no correlation to habitat characteristics) is, simply put, useless. Actually, it is worse than useless because it produces erroneous, misleading data. Because the Tuxekan DEIS bases its estimates of project impacts on deer, susistence, and wolves almost entirely on this faulty model, the DEIS is invalid. It serve can neither as the basis for reasoned decisionmaking and informed public participation in the planning process nor as the basis for an FEIS. Plainly, a Supplemental DEIS will be necessary if the projec is to proceed.

THE SECOND REASON THE MODEL IS INVALID: The deer model has failed to achieve the scientific endorsements that were sought for it, yet the Forest Service consistently claims (as in the NEPA documents for this project) that the model has scientific endorsement. In addition, the model has never been verified. We believe claim of endorsement by scientists is fraudulent, and that the Forest Service's claim that the model is valid is meritlesss.

The following is a documented history of the 1997 Forest Plan deer model, the model used in planning the Tuxekan project. This history exposes the fraud we allege, and shows that there is no justification for using that model under any circumstances.

On November 7, 1995, the Forest Service convened a panel of four scientists who have deer expertise to review a new model that was intended to replace the Suring et al. deer model. [See Exhibit 1, the notes of the meeting, titled "Sitka Black-tailed Deer Panel."] The meeting was part of the work done on deer modeling during the Forest Plan revision process, and was led by Gene DeGayner of the Forest Service. A day and a half were allotted for the meeting. Two of the four panelists had no on-the-ground experience in Southeast Alaska. The notes state that a purpose of the meeting was to develop a habitat model for

deer, using the new model as a starting point. However, the following statements by panelists (as recorded in the notes) show that the objective was unrealistic:

- *Said in reference to the new model that the panel was expected to work from: "As a group of scientists we can only say there are problems without making an endorsement (would take months) ..." [p.3]*

- *"You are asking us, in a two hour time span, to complete the analysis for the model, when two of us have not even been on the ground? [p.3]*

- *"Do you want an endorsement?" DeGayner replied, "No, I just want you to air your concerns." [p.3]*

Those statements were made early in the meeting. Near the end of the meeting there was this exchange:

- *"This makes the point that we sit here without any data. ... The concern is that we are building a model based on no data. ... It makes me realize how inadequate the process is." [p.9]*

Accordingly, asked how the rest of the panel feels about the process, some of the replies were:

- *"Forest Plan should afford more than a day and a half of work to build a deer model." [p.9]*

- *"... the relative numbers may be of some value. There was no time to be pensive and analyze all the numbers." [p.9]*

- *"... the model is totally inadequate based on the time spent, I would be much more comfortable using the Suring model. There is not much point in us developing a new model or criticizing the old model at this point in time." [p.9]*

- *"This model really has not been tested, people need to continue to validate. We really need to follow up on this stuff and validate or go back and modify the model." [p.9]*

A few weeks later, on December 12, 1995, Matt Kirchhoff (ADF&G's deer expert) sent a memo to Chris Iverson (USFS) concerning wildly different results from the new model compared to the Suring model. The new model was already using some coefficients updated at the panel's recommendation. For WAAs (Wildlife Analysis Areas) on Heceta and Kosciusko Islands, Kirchhoff found that the new model was showing impacts to deer habitat capability to be 49% and 55% lower (respectively) than the Suring model. In both cases the Suring model showed a 91% loss of habitat capability. [Exhibit 2.]

On January 21, 1996, DeGayner replied to Kirchhoff with a copy of a memo that he submitted to the Forest Plan Revision Planning Files. [Exhibit 3.] It reveals that some model errors had been corrected since Kirchhoff's memo, thereby creating a newer model that DeGayner called the "verified model." (This label for the new model gives it credibility it does not deserve, as will become apparent.) DeGayner's memo notes that there continued to be discrepancies between the outputs of his so-called verified model and the Suring model, and he stated how these differences could "probably be explained."

On January 23, 1996 Kirchhoff replied to DeGayner's memo. After noting that he was using DeGayner's model names, he said: "What is still not clear to me, however, is why the Suring model and the new verified model produce such

different end-of-rotation numbers on the same WAAs, for essentially the same alternatives. You suggest possible explanations for the differences, but a more quantitative assessment would be comforting." [Exhibit 4.]

In response, on February 5, 1996 DeGayner produced another memo for the planning record. [Exhibit 5.] DeGayner said: "We have done a quantitative analysis of the habitat capability estimates produced from the new Verified Deer Model and the model used in the 1991 Forest Plan SEIS. Estimates of habitat decline were overstated in the 1991 Forest Plan SEIS." The model used in the 1991 SEIS was the Suring model. In this memo DeGayner "attributed" the differences between his model and the Suring model to three causes, and he reached an unsupported assumption that the older Suring model is the one in error. The fact that the Suring model and the new model use different data sets to represent forest characteristics (TimTyp for the Suring model and Volume Strata for the new model) was not mentioned.

In Table 1 of this February 5 memo, DeGayner referred to the new model both as the "Panel Model" and the "verified panel-based deer model." We consider this labeling to be fraudulent. It confers an endorsement of the model that the record shows the deer panel certainly did not give. There is no legitimate claim for the model being either verified or panel-based. The panel meeting notes provide no support for the claims that the panel authored, endorsed or verified the model, or that the model is otherwise reliable. DeGayner closed his memo to the planning record by recommending that his model "be used as currently designed for evaluating alternatives and future modeling within FORPLAN" for the Forest Plan revision. In fact, the notes of the deer panel meeting and Kirchhoff's preceding correspondence (as well as his later correspondence) indicate that this recommendation was contraindicated.

To call the model "panel-based," with no mention of the panel process and the caveats provided by the panelists, was not honest. Nonetheless, the February 5 memo's recommendation provided a foundation for relying on the new model (and later variations of it) in the Forest Plan Revision, its ROD, its FEIS, and in the planning of projects like Tuxekan.

Prior to this memo, one issue with the new model had been the carrying capacity "multiplier" for how many deer per square mile are represented in the model by a habitat suitability index of 1.0. Kirchhoff addressed the issue a few weeks after the deer panel meeting, in a November 27, 1995 memo to DeGayner and Chris Iverson. [Exhibit 6.] After some detailed explanation Kirchhoff concluded: "I believe these exercises support the notion that maximum deer density on the best quality old-growth habitat is between 75 and 100 deer per square mile." Because of limited empirical data and necessary "reaching assumptions" he added, "My inclination would be to choose a conservative (lower) number within that range to be on the safe side."

DeGayner took that advice to heart, and in a handwritten note at the bottom of Kirchhoff's copy of the January 21, 1996 memo [Exhibit 3, supra.], DeGayner inscribed: "I used 75 deer/sq-mile as the base deer multiplier."

DeGayner continued to work on the new model. On May 7, 1996 he convened a meeting of biologists from the Forest Service, the Forest Sciences Laboratory, ADF&G and USFWS to review the deer model. The meeting was continued for a second day on May 12. The meeting is memorialized in a memo from DeGayner dated May 8, 1996 [Exhibit 7], in another DeGayner memo to the planning file

dated June 17, 1996 [Exhibit 8], and in a memo by Ed Grossman of USF&WS dated November 14, 1996 [Exhibit 9].

Between the two sessions of the May interagency meeting, DeGayner sent the above May 8 memo, which was addressed to "May 7th deer modelers." He said: "Clearly, the May 7th Model outputs are too low with a 75 deer/sq mile multiplier. So I have displayed the May 7th Model with a 125 deer/sq mile multiplier as a possible alternative." More on this shortly.

DeGayner's June 17, 1996 memo (Exhibit 8, supra) to the Forest Plan record starts out by saying the purpose of the interagency meeting was to "discuss the deer habitat capability model developed by a panel of deer experts for the Forest Plan revision in November 1995." [Emphasis added.] Clearly however, as we have shown, the deer panel did not endorse, much less develop, this model. DeGayner's statement is patently false, yet it continues to build the fiction of scientific credibility for the model. It suggests that the model was introduced at the later May 1996 meeting of interagency biologists with an aura of preexisting credibility than it deserved. The memo goes on, toward the bottom of its first page, to name the model considered during the May meeting the "Interagency Modified Panel Model (IMPM)." (Emphasis added.) This fortified the fiction of this model's credibility! We do not believe that this panel of scientists was any more able to develop a deer model in the short time allowed than was the November 1995 panel. The memo also says, "This group recommends that this alternative model be used to support the Forest Plan revision;" however, Grossman's later memo contradicts this. Grossman's November 1996 memo to Kirchhoff [Supra.] refers to the May interagency sessions, and exposes the scam: "The Forest Service indicates that they consider the new model debate to be over as of this Spring's meeting on the subject. John Lindell, Richard Enriquez, and Winston Smith (all present at this past week's meeting with the Forest Service) recall that the controversy regarding the model was still unsettled. They recall that you were going to compare some new model outputs with your pellet count data to see if they made sense. The Forest Service continues to indicate that you are comfortable with this model. If this is the case, is your comfort based on such a comparison?"

The Grossman memo reveals continuing controversy in the scientific community over the reliability of the Forest Plan deer model; controversy that is not mentioned in any of the Forest Service documentation. Grossman's memo asked Kirchhoff for a response by the next day because the Forest Service wanted comment by then. We have found no record of a response by Kirchhoff, although in 2002 he said that he had always been, and continued to be, uncomfortable with Forest Plan deer model. [Pers. com. 1/7/02 with Larry Edwards.]

Grossman's memo also indicates the importance of the model and his concern over it, as shown here with a few extracts from the memo. (1) "The new model projections are being weighted significantly in decisions regarding wolf (and deer) management under the new Forest Plan." (2) "These data appear to be unrealistically optimistic." (3) "On the ground observations and comparisons of these estimates with other areas do not support the density estimates projected."

On January 29, 1997 a conclusive memo was submitted to the Forest Plan Revision planning record, titled "End of Rotation Deer Model Assumptions for Forest Plan FEIS." [Exhibit 10.] The author is unknown. It begins: "This memo documents the procedures and assumptions used to model deer habitat capability at 2005 and 2095 for the Forest Plan FEIS. This memo supplements the analysis

presented in the FEIS." In other words, the memo was placed in the record and was available to the Forest Plan decisionmake between the time the FEIS was completed and the date the Forest Plan Revision ROD was signed several months later, on May 23, 1997.

This key memo displays, prominently on its first page, three outrageous statements that vary from extremely misleading to patently false:

1. "The Suring et al. (1993) model has undergone numerous reviews, including a PNW review (Kiester and Eckhardt, 1994)." This implies that the model passed review with flying colors, since no problems with it are noted. In fact, the Kiester and Eckhardt, et al. review was very critical of the practice of placing substantial reliance on any habitat capability model, and identified many limitations and pitfalls of doing so.

2. The next paragraph says: "A panel of deer experts reviewed the Suring et al. (1993)" model. "The panel suggested an simpler (fewer variables) format, new volume classes, and other minor updates." (sic, emphasis added.)

Much of that is simply not true, for these reasons:

•The deer panel reviewed the new model, not the Suring model, and in fact some panel members would have preferred to work from the Suring model. [See Exhibit 1, supra.]

•The new model with its "simpler format" is what the panel was provided to review, but the panelists questioned that model's simplicity. They did not suggest a simpler model format. [See Exhibit 1, supra.]

•The panel did not suggest that the new timber classes (e.g. Volume Strata) be used; it was told that the classification was changed from the TimTyp (Volume Class) classifications to the volume strata classifications because the TimTyp maps were considered unreliable. [See Exhibit 1, p.2, lower half. Supra.] It is now well known, however, that TimTyp is unreliable only for inventorying timber volume, and that it is adequate for representing wildlife habitat. (Caouette, et al. 2000, supra.)

•The panel was also told by Terry Shaw, a Forest Plan planning team member, "The new model gives you three (statistically valid) TimTyp types. It is not statistical to use at the mean volume, we don't know how to test. That issue will be resolved in three years when the analysis (forest inventory) is complete." [Exhibit 1, p.3 bottom and p.4 top. Supra.] (Note that Shaw's reference to TimTyp is incorrect and instead refers to the new competing timber typing Volume Strata dataset. From the context he was referring to the three new Volume Stratas of High, Medium and Low volume, not to TimTyp Volume Classes. The reference to TimTyp on page 2 of the notes is made correctly to the prior volume class classifications, Volume Classes 4 through 7.)

The change from reliance on TimTyp (Volume Class) data to Volume Strata data for deer modeling was not a "minor update," contrary to the January 29, 1997 memo's claim. We contend that it was a highly significant update, and it is very likely responsible for much of the unreliability that became obvious and concerned the scientists who reviewed the model. (Recall especially Kirchhoff's observation that the new model grossly understates impacts, and Grossman's November 1996 memo.)

The January 29, 1997 memo continues: "These suggestions were incorporated into the model used in the Revised Supplement to Draft EIS (RSDEIS). This model is called the Forest Plan Panel Model." [Original emphasis.] As we have already shown above, the panel neither endorsed nor developed the model. Calling it the Panel Model falsely confers scientific legitimacy the model does not deserved

3. The last paragraph on the page of the January 29, 1997 memo says: "An interagency workshop reviewed the model in the RSDEIS and suggested some additional changes. ... Also, the multiplier used to estimate carrying capacity (K) was increased to make model outputs consistent with hunter deer harvest and pellet data sets." It is highly questionable, however, that increasing the multiplier from 75 deer per square mile back to 125 deer per square mile was ever endorsed by the interagency meeting participants. Kirchhoff has never been comfortable with the higher figure. [Pers. com. 1/7/02, Kirchhoff with Larry Edwards.] The US Fish and Wildlife Service, which had two representatives at the interagency meetings, has continued to request a multiplier of 100 (the higher end of Kirchhoff's suggested range) in comments on project environmental impact statements (for example, the Tuxekan Bay DEIS, 3-133). (Note that USF&WS was then unaware of ADF&G's preference for a coefficient of 75. and will likely review ADF&G's reasoning for the lower figure. [Pers. com. 1/8/02, Ed Grossman with Larry Edwards.])

The January 29, 1997 memo goes on: "The above suggestions were incorporated into the Forest Plan Panel. This model is called the Interagency Modified Panel Model." [Original emphasis.] As indicated by the Grossman memo of two months earlier, by subsequent comments by USF& WS and ADF&G on environmental impact statements, and by the cited conversation with Kirchhoff [Supra.], we believe the name given the model (especially with the emphasis) misrepresents the interagency scientists who reviewed the model. The aura of scientific credibility the Forest Service has repeatedly tried to establish for the new model, throughout its development and later use at the project level, is false. The model cannot stand on its own; it can only be propped up with subterfuge, doublespeak and fraud.

A crowning blow to the Forest Plan deer model came with publication of the Caouette et al. (2000) study. This peer-reviewed study shows that there is no correlation between the dataset the model relies upon (volume strata) and habitat structure. The model cannot be expected to function because the data it uses does not look at relevant forest structure. The model should instead have relied upon the too hastily discarded TimTyp dataset. While that data set has poor correlation with what it was intended to show (timber volume inventory), it has good correlation with what photo interpreters saw when they compiled it – forest structure that relates to old-growth habitat. This is not a brilliant deduction; it is common sense. In fact, comments were made by the public during the Forest Plan revision process that the TimTyp dataset should not be abandoned for this very reason, and related comments were also made by scientists during their participation on the 1995 deer panel. The Caouette et al. (2000) study validates these perceptions, exposing the unjustifiable fundamentals that are at the foundation of the 1997 Forest Plan deer model.

Response 5.15 See Response to Comment 5.13 and 5.14.

Comment 5.16 ***The Tuxekan Project Analysis Relies Heavily On The Forest Service's Deer Model Despite Known, General Faults With Such Habitat Capability Models***.

The Tuxekan DEIS relies very heavily on modeling of deer habitat capability in its analysis of project impacts on deer, viability of the island's wolf population, and subsistence and non-rural deer hunting.

This heavy reliance was made even though habitat capability models are well known to be very crude, and despite the issue of whether they should be relied upon heavily, which has been raised for this project as well as for many other projects on the Tongass. Failure to disclose and discuss this issue is a violation of NEPA, and the failure to avoid heavy reliance on modeling has resulted in unreliable impact analyses.

The following short quotes from the peer review of the Forest Plan's wildlife conservation strategy (Kiester, Eckhardt, et al, 1994) illustrate our many concerns:

- *"... none (of the Habitat Capability Models) has any calculation of the probable error associated with them. The modeling approach needs to be rethought and a program of work to develop them into models that have Tongass-specific data and confidence limits needs to be developed." (Kiester & Eckhardt, p.5.)*

- *"Habitat Capability Models in General: We have a good deal of reservation about the HCMs. The greatest concern is about the false precision that the models imply. They may be precise, but the 13 accuracy is unknown and we assume it to be very low. The models are deterministic and do not take into account any stochastic features of the relationship between habitat and population and they are parameterized with data whose error limits are unknown and very likely high. Thus the confidence limits for the models, were they to be calculated in some way, would surely be so large as to render the models close to useless. Also, as the authors of 'Models' point out, the models may be quite sensitive to small changes in parameter values in ways that are not understood." (Kiester & Eckhardt, p.14.)*

- *"These models have played a useful role in organizing current knowledge and emphasizing knowledge gaps, but it is now time to build on this beginning and move to more realistic approaches whose confidence limits can be calculated. (Also p.14.)*

- *Specific to the Sitka Black-tailed deer model: "The sampling and analysis techniques used to verify the model are problematic in that there is not enough methodological information available on which to evaluate the analyses. ... An additional concern addresses the issue of using a mean value for snowfall throughout the (Tongass) when there is considerable variation from northern to southern regions of the forest. The model needs to incorporate these issues in order to provide a realistic assessment of the habitat. The HCA model for maintaining viable populations of Sitka black-tailed deer on the Tongass National Forest is probably not suited for the long term. McCullough expresses concerns that problems of oscillating factors may create extremes in population that would make the deer especially vulnerable to the pressures of hunting and wolf predation. This combination of factors could place the viability of the species in question." (Kiester & Eckhardt, p.22.)*

•Additional concerns were raised in peer reviews of "Response of the Interagency Viable Wildlife Populations Committee, May 1994":

•"Rule based modeling is a more realistic approach than quantitative modeling, given our level of understanding of the relation of habitat to population abundance. In fact, expecting a strict quantitative relation between specific habitat components and population abundance is a naive view of how nature functions." (Review by Jarvis, p.75 in Kiester & Eckhardt.)

•"The major weakness of HSI (habitat suitability modeling) is that it fails to account for many factors of population dynamics that are potentially important for population viability. Potentially important factors that are only partially accounted for, or completely absent from HSIs, include the effects of habitat fragmentation and edge effects on migration and dispersal, losses due to hunting and trapping, and the effects of demographic and environmental fluctuations on population size and distribution. In some cases only a single limiting factor is identified and included in the HSI, i.e. ... winter habitat for marten and Sitka black-tailed deer, although it is acknowledged that other factors, such as quality of summer forage for Sitka black-tailed deer, have a major influence on reproduction and survival. Thus the approach of HSIs make them intrinsically optimistic, and they may often be poor indicators of population viability." (Review by Lande, p.78 of Kiester & Eckhardt.)

•"The habitat capability models as presented in `Models' and as utilized in the `Strategy' suffer from two conceptual weaknesses. The first is that species interactions are difficult to include, other than with those species that enter into the habitat description itself. To some extent this was handled by considering patches with and without some other species present, e.g. wolf. The second flaw is the failure to incorporate landscape features into the model. This problem is not acknowledged explicitly in the reports, but in at least three cases the importance of juxtaposition of two different habitat types was pointed out." The cases cited are brown bear, otters, and mountain goats, omitted here for brevity. "It is in fact frequently the case that species will require several different habitat types either simultaneously or over the course of an annual cycle. Often these life history features were mentioned in the narrative descriptions of the various species, but generally got lost when the habitat capability models were developed. The results are especially misleading when each habitattype is presented as supporting a particular density of individuals. Suppose, for example, that one focal species was found to have a density of nine in habitat A and one in habitat B. The obvious conclusion would be that A is this species' habitat and B can be safely eliminated. It may be in fact that our species requires both habitats A and B but spends 90% of its time in A and only 10% of its time in B. In this case eliminating B would cause extinction of our focal species." (Review by Lidicker, p.89, Kiester & Eckhardt.)

•"HSI models address potential population size given the quality of the habitat, not the actual populations. The actual populations may at times achieve this level, but ordinarily would be lower because of predators, hard weather, competitors, diseases, hunting, etc., etc. Thus, the actual population over a broad area would almost invariably be below that predicted by the HSI model." (Review by McCullogh, p.113, Kiester & Eckhardt.)

•"I would argue that there is no logical way to verify an HIS model. It is an expert judgement system about habitat quality that lacks an objectively measurable population size correlate that will verify the model. It proceeds from 'we think this

is right' at development, to 'we still think this is right' after comparison of empirical results, which may agree or disagree greatly depending on the combination of other factors impinging on the population over its recent history. This is exactly why HSIs have such a poor reputation in the scientific literature." (McCullogh, same page.)

•"It is not clear how roads, dumps, and other sources of contact with humans are incorporated into the computer programs at the end of the chapters on the wildlife species. These are important components of the habitat capability models for both bear and martens. It appears, in fact, as though the negative effects of these human components have not been included in the computer models at all. I find this a bit scary. If this exceedingly important aspect of the habitat capability models is not included in the computer models, what else has been omitted? Can the computer models be trusted at all to mimic the written explanations of the habitat capability models? If the computer models are missing important components, what good are they? Nor is it clear how juxtaposition and interspersion of habitats are included either in the verbal habitat capability models or in the compute models. These appear to be mentioned in the text and then dropped, despite their importance. Did the authors assume that juxtaposition and interspersion would not be problematic and therefore could be ignored in the computer models? If this is the case, it must be justified. As habitats change, as is projected because of logging, juxtaposition and interspersion of habitats will change. Therefore these must be incorporated into the models." (Review by Powell, p.159, Kiester & Eckhardt.)

The above extracts from statements by scientists expert in this field show that our concern over heavy or sole reliance on modeling, such as in Tuxekan project planning, are well supported and widespread.

Response 5.16 See Response to Comment 5.13.

Comment 5.17 *As detailed elsewhere in these comments, the Forest Service is required by law to disclose when scientific uncertainty and /or opposition exists. The Emerald Bay SDEIS fails to do this in regard to the use and reliance of wildlife models both in the larger Forest Plan context as well as at the project level.*

The Emerald Bay SDEIS violates NEPA because: 1) it fails to disclose and fully and fairly discuss the downside of the heavy reliance it has placed on modeling; and 2) it fails to use additional analytical methods to assess impacts on wildlife, that would reduce reliance on models.

Response 5.17 This comment is unrelated to the Tuxekan Project.

In addition to the deer model used in the Tuxekan Project, effects analysis for deer included changes in high-value deer habitat, changes in coarse-structured stands, and changes in road densities. The analysis can be found in the *FEIS: Chapter 2, Table 2-3. Responsiveness of alternatives to the issues, Issue 3: Wildlife*, pp. 2-35 to 2-36; *Chapter 3, Issue 3 – Wildlife: Table 3-42. Comparison of effects by alternative for Issue 3*, p.3-77, *Deer Habitat and Subsistence Use*, pp. 3-99 to 3-122, *Wildlife, MIS Accounts, Sitka Black-tailed Deer*, pp. 3-171 to 3-177 .

Comment 5.18 ***In Light of the 1997 Deer Model's Flaws, the Analysis of Impact on Wolves is Invalid***.

In the Tuxekan DEIS, the analysis of project impacts on wolves relies in several ways on the Forest Service deer model. As described above, that model is invalid because it relies on the wrong kind of data and otherwise has not been validated. Consequently, the wolf analysis in the DEIS is invalid.

The project's Wildlife Report and its Biological Analysis and Evaluation cite an estimated total 1995 wolf population in Southeast Alaska of 700 to 1,100 animals, from Person (2001). Although we believe the methods and analysis employed in Person (2001) are well conceived, the estimates in that paper are dependent on the erroneous Forest Service deer model. We believe the deer model over estimates current deer habitat capability and under estimates impacts on deer.

Response 5.18 See Response to Comment 5.13.

The analysis for wolves has been updated and addresses changes to secure habitats as a result of roading and vulnerability to hunting and trapping, as well as changes to prey populations.

Comment 5.19 *More specific to the Tuxekan project area, David Person should be requested by the project to rerun his modeling system with a new Forest Service deer model (that relies on TimTyp Volume Class data) or the 1992 Suring model at its root. Also, we believe that the analysis area for the Tuxekan project should be expanded to include the entire home range of the wolf pack that uses Tuxekan Island. This should be the basis for a detailed cumulative analysis of impacts on the wolf pack of this and other past, present and future logging projects. We believe that the wolf population on Prince of Wales Island and associated islands (such as Tuxekan) is a genetically isolated population, and that the Forest Service has failed to give this sufficient consideration in its considerations of wolf viability both locally and regionally. Simply following Forest Plan Standards and Guidelines is not sufficient to assure the wolf is provided for.*

Response 5.19 See Response to Comment 5.18.

The cumulative effects section does consider reasonably foreseeable future actions that may occur on POW Island, which may be within the Staney packs home range.

Comment 5.20 *Adequate field work that would be useful in estimating the total Alexander Archipelago wolf population has been completed only for Prince of Wales Island and associated islands. The number of individuals in the other subpopulations (on the mainland and other islands) of the subspecies have been estimated only very roughly. That estimate, however, is based entirely on the habitat carrying capacity as estimated by the Forest Service deer model. Because that cannot be relied upon, the estimate of the subspecies' total population is not reliable. As stated elsewhere in these comments, we believe the deer model overestimates winter deer habitat capability because of the model's reliance on irrelevant Volume Strata data. Consequently, viability of the Alexander Archipelago wolf is of great concern both in terms of the Tuxekan project and generally.*

Response 5.20 The analysis for wolves (*FEIS, Chapter 3, Wildlife, Alexander archipelago Wolf, pp.* 3-183 through 3-187) has been updated and addresses changes to secure habitats as a result of roading and vulnerability to hunting and trapping, as well as changes to prey populations.

Comment 5.21 *The project's Wildlife Report refers to the 1997 decision by the US Fish and Wildlife Service not to list the Alexander Archipelago wolf, based on implementation of then new Forest Plan's conservation strategy. The next version of the Tuxekan EIS needs to recognize that the adequacy of that conservation strategy was challenged in a 1997 Joint Statement, written in response to the new Forest Plan, from about a dozen of the scientists who had peer reviewed a draft of the conservation strategy. This is highly significant, and is in addition to the more recent discovery of invalidity of the Forest Service deer model.*

Please include this document in the planning record, and give it prominent consideration in all of your wildlife analyses, not just for the wolf.

Response 5.21 The ROD (1997) for the Forest Plan summarizes the reviews that the old growth conservation strategy went through. The ROD also recognizes that the small OGRs will be reviewed as projects are being planned. The small OGRs have been reviewed by an Interagency group and their recommendations have been included in Alternatives 4 and 5 (and only slight modifications in Alternative 2).

The ROD also states that there will be a review of the old growth strategy. The Forest Plan 5-year Review (12/04) states that preliminary work in support of the conservation strategy review has begun, and the Tongass will be conducting this review with interagency partners and the research branch of the Forest Service.

Comment 5.22 *A Rebuttal To Recent USFS Support For the 1997 Deer Model And Its Application.*

In 2004 the Forest Service issued an appeal decision that contradicts many of the assertions we have made above. This section is a rebuttal to certain points raised in Threemile Appeal Reviewing Officer Cherie Shelley's discussion of Issue 5 (on pages 11 and 12 of her recommendations to the Appeal Deciding Officer, dated October 6, 2004). We refer to these points as "Forest Service assertions" since they were affirmed by the Deciding Officer's acceptance of the recommendations.

1. ***FS Assertion****: "ADF&G biologists have funded and conducted studies and published several papers in peer reviewed journals over the past 20 years on how deer interact with their habitat. These studies have shown that timber volume is a good predictor of winter deer range, and ADF&G has argued that low elevation, high volume old-growth timber stands be conserved." (Emphasis added.)*

The FS Error*: In order to correctly interpret the ADF&G biologists' research, studies and advice, it is necessary to understand what these biologists mean when they use the terms "timber volume" and "high volume." It is apparent throughout the Reviewing Officer's discussion of Issue-5 that she did not have the requisite understanding of what these terms mean in the jargon of wildlife biologists from other agencies (USF&WS as well as ADF&G). The problem here really amounts to determining which dataset (or data map) was being referenced in scientific work or was actually applicable to the work. Three "eras" of understanding must be kept in mind concerning GIS data purported to*

characterize habitat quality. In the first era, which lasted until relatively late in the planning process for the 1997 Tongass Forest Plan, reference was to the TimTyp so-called Volume Class dataset (or map), which the scientist recognized as correlating well to habitat quality. This is the era in which "volume" jargon entered biological discourse. The second era began around 1995 with promotion by the Forest Service of the Volume Strata dataset (or map). For a time, the Volume Strata dataset was believed to more accurately represent habitat because it was designed to accurately classify land by timber volume (which the TimTyp dataset had been proven not to do, despite the Volume Class labels for its classifications). The essence of what happened is that, for a time, scientists fell victim to their own "volume" jargon and mistakenly believed that the then new dataset that showed volume accurately would also represent habitat quality accurately. The third era began at different times for different people or organizations, as each began to realize that the Volume Strata dataset in fact has poor correlation to habitat quality. Some personnel in the Forest Service have yet to come to this realization, despite the agency's own scientific work that establishes the inapplicability of the Volume Strata dataset to habitat assessment. (Caouette, Kramer & Nowacki, PNW-GTR-482, March 2000) In view of this history and the resulting profusion of confusing terms and datasets that use the word "volume," great care must be taken in interpreting documents about deer habitat. It is necessary to determine for each document what is meant by "volume," which dataset it references, and whether the correct dataset was actually being employed. The Appeal Reviewing Officer did not take such care, and in fact overlooked this issue of confusing lexicon.

*2. **FS Assertion**: "This research was considered and used in the development of the deer model and is in the project record [see, for example, Schoen and Kirchhoff, 1990, referenced in decision document #49, p. B-60]"*

***The FS Error**: The appeal points were not whether ADF&G research was "considered and used" in developing the deer model. The points were: 1) that the research and other expert consultation were not correctly incorporated into the 1997 model; 2) that the record shows the 1997 model was not in fact an honest attempt to incorporate research and expert opinion; 3) that grossly different results between the 1997 model and the Suring model were never resolved and that the 1997 was therefore not verified despite Forest Service claims to the contrary; and 4) that the 1997 model relies upon a forest-character dataset that bears no relationship to habitat quality. The Appeal Reviewing Officer did not investigate these substantive points. In addition, we point out that Schoen and Kirchhoff 1990 is an "First Era" document (see above). References therein to "high volume" timber are therefore not references to timber volume as portrayed by the Volume Strata dataset used in the 1997 Forest Plan deer model, but rather to habitat characteristics as portrayed by the TimTyp dataset's so-called Volume Classes.*

The large difference in how the two datasets represent the forest is well illustrated by the following PowerPoint slides on the following pages, used in a presentation by John Caouette in Ketchikan in 2002. (The complete PowerPoint presentation is available on the USFS PNW Research Station website.) The presentation was of findings made on a study of forest structure on Chichagof Island by Caouette and others that compared the capabilities two datasets, Volume Class and Volume Strata. The captions provided below are ours.

(Slides enclosed can be found in the Tuxekan Project File)

This first slide (consisting of two photos) depicts how well the TimTyp dataset distinguishes between qualities of habitat, here showing differing qualities between Volume Classes 5 and 6. A winter habitat capability model (such as the 1992 Suring deer model) based on this dataset can be expected to do a good job of taking into account the abilities of the canopies of stands of varying quality to intercept snow.

The term "High volume" timber as used in first era biological studies (e.g. Schoen and Kirchhoff) refers to Volume Class 6 and higher forest. The Suring deer model was based on this dataset. (The diagrams to the left of the photos depict the Chichagof Island forest stands where these photos were taken.) TimTyp does not really classify in terms of "volume," but in terms of habitat structure.

(Slides enclosed can be found in the Tuxekan Project File)

The second slide (consisting of three photos) depicts kinds of forest that are lumped together into what the later (mid-1990s) Volume Strata dataset calls "high volume" timber. Comparing this slide and the previous one, it is clear that the term "high volume" has a hugely different meaning, depending on which dataset is being referenced. Second era works, such as the 1997 Forest Plan deer model and all project level planning since the Forest Plan was adopted, base their supposed predictions of logging impacts to old-growth habitat on the Volume Strata dataset's concept of "high volume" timber. While the Volume Strata dataset provides an accurate inventory of timber volume, it is obvious that it is incapable of representing habitat quality. It classifies the forest according to true timber volume density, irrespective of tree size and the crown structure of the forest stand which are necessary elements of classifying habitat.

*3. **FS Assertion**: "Research has also demonstrated that the volume stratum map is a statistically valid method of stratifying the forest for timber volume [decision document #46]."*

***The FS Error**: Although the statement is true, its application in the context of the Appeal issues has led the Appeal Reviewing Officer to a false conclusion. The statement is wholly irrelevant to the Appeal issues, and a more thorough review of the literature proves this. Document #46, cited by the Reviewing Officer, is a study by Julin and Caouette published in March 1997, and is an "Second Era" document (see above). A study published three years later (Caouette, Kramer & Nowacki, PNW-GTR-482, March 2000) provides a more complete analysis that builds on the earlier document and establishes an entry into the "Third Era." The above slides fit with this analysis, which poses and answers the question "Do the original timber volume strata (4-7) accurately capture volume differences in the Tongass or are they more oriented toward differences in forest structure?" (p.10) The following excepts regarding that question are illuminating:*

•"Although the revised timber volume strata provide significant differences in timber volume (Julin and Caouette 1997), available information, which could be useful in modeling differences in forest structure, has been sacrificed." (p.14)

•"Our analyses demonstrated that forest structure and timber volume are not directly correlated." (p.17)

•"Although the revised timber volume strata provide more reliable volume data, many interested parties remain unsatisfied. One scientist stated that "the richest old growth and the less valuable stands are classified into a single category [high

volume]" (Schlickeisen 1998)." (p.17, emphasis added.) The richness here refers to habitat value, not timber value.

- *"It seems that many people are dissatisfied with the revised timber volume strata because they want to see forest structure delineated and mapped for the Tongass. … Any forest stratification that has timber volume as its primary objective will necessarily group together stands of similar timber volume regardless of differences in forest structure. Our analysis showed that this is what happened in the timber stratum revision process (Julin and Caouette 1997). During this process, differences in forest structure were collapsed into a single category because they showed no significant difference in mean timber volume". (P.17, emphasis added. Note that the "single category" is High Volume Strata.)*

*4. **FS Assertion**: "It is reasonable that the deer model used the volume-stratum map, since it was the only statistically valid map available at the time and it utilized ADF&G's research findings on deer habitat selection and timber volume."*

*The **FS Error**: The statement is false. The Reviewing Officer failed to distinguish for what the map is statistically valid and for what it is not statistically valid. The Volume Strata dataset (or map) was proven (Caouette, Kramer & Nowacki 2000) to be statistically not valid for assessing habitat quality. The only currently available dataset that is valid for assessing habitat is TimTyp. (Ibid.)*

*5. **FS Assertion**: "This map is undergoing peer review and has not been tested for its utility for evaluating deer habitat, whereas timber volume has been extensively evaluated. A method that utilizes tree diameters and tree densities may better discriminate forest structure and timber volume.*

That method is in its final evaluations now and could be evaluated for use in updating the deer model."

*The **FS Error**: This new map (Veg-Mod) is irrelevant because it is not available for use. Under NEPA, the Forest Service must use the best available data. For the purpose of assessing impacts to deer, the best available data is the TimTyp Volume Class dataset. As a separate consideration there is no legitimate justification, and this includes the non-availability of the Veg-Mod dataset, for using the Volume Strata dataset to assess habitat quality because it is not suitable for this task.*

*6. **FS Assertion**: "Several statements in the Threemile FEIS acknowledge the concern about confidence in the model. In brief: the word "theoretical" was used to indicate uncertainty; the model was evaluated by field surveys; the model represents just one tool in project level analysis; models are best used to make relative comparisons between alternatives rather than actual population predictions. Any changes in the model will be the result of field observations, thorough analysis, and peer review [FEIS, pp. 3-128, 3-166, 3-169, and 3-176]."*

The FS Errors:In the FEIS the Forest Service relied primarily on the deer model for the relevant analyses; other tools played a minor role.Although field surveys are mentioned in the FEIS, there is no discussion of how or whether these surveys were used to evaluate the model – in fact, every indication is that the surveys were done for other purposes.The word "theoretical" is not on any of the pages cited (in fact those pages are not relevant to any of the above assertions).Even if the FEIS does recognize the theoretical aspects of the deer model, it repeatedly suggests that the model overestimates impacts but does not disclose any of the

many factors that cause the model to underestimate impacts or to give wild results.

7. ***FS Assertion****: "Appellants further assert that the FEIS discussion of the effects of partial harvest is misleading. I disagree. The appeal does not question the results of the model. Nor have appellants disagreed with the way a specific area on the map published in the EIS was scored."*

The FS Error*: To the contrary – the appeal strongly questions both the model and its results, and the appeal challenges the generalized claim of the FEIS that, simply because the model assumes partial cuts to have the same impact as clearcuts, project impacts are less than the model suggests. The FEIS ignores factors that lead the model to underestimate impacts, while emphasizing this claim of overestimation (a claim that has been challenged by ADF&G biologists based on field experience). Further, it is not germane to cite a specific area in pointing out the unfairness of the generalized claims in the FEIS.*

8. ***FS Assertion****: "There is an exception, however; the appellants questioned the Forest's judgment about the value of winter range that has had a partial harvest prescription applied. The Forest gave partial cuts the same value as clearcuts, but stated that this was a `worst case' assumption." Several studies by Deal are cited. "The idea that partial cutting may provide some benefit to deer and other wildlife is not an unsupported supposition. Given that these papers are in the project record, the Forest's approach was reasonable and not arbitrary."*

The FS Error*: We do not have the studies by Deal. As represented in the Threemile project's Wildlife Specialist Report, his studies focus on browse generally, and not winter habitat. The deer model focuses on winter habitat. The effects of partial cutting and how (or whether) to treat it in the deer model has been controversial, but the presentation in the report and the FEIS is one-sided and disregards the controversy. As an example that highlights the controversy there is this in the Gravina planning record:*

"Furthermore, feedback Jim (Zelenack, project biologist) has received from commenting agency biologists indicates they do not think partial cutting they have seen so far should be given any credit in the current deer model." (See record of IDT meeting for Gravina project, 3/21/00. We request that this document be added to the Emerald Bay planning record.)

9. ***FS Assertion****: "ADF&G (Person and Kirchhoff) evaluated the deer model and reported their results at the 2000 Annual Meeting of the Alaska Chapter of the Wildlife Society in Juneau. They compared model results with their pellet data set and reported a significant positive relationship (regression) between deer model scores and pellet densities."*

The FS Error*: Person and Kirchhoff have not given the 1997 deer model the endorsement that is implied above, according to our reading of their study. The study presented at the 2000 meeting is contained in Appendix 1 of Person & Bowyer, 1997 ("Population Viability Analysis of Wolves on Prince of Wales and Kosciusko Islands," prepared for the US Fish and Wildlife Service). Some extracts from the study (including some commentary by us) are illuminating:*

•"The model has not been validated (if in fact it can be validated) and has undergone little review. It was designed as an index; however, it is currently being used to predict actual deer numbers in order to evaluate whether various timber harvest alternatives meet the recommendations of the wolf conservation

assessment. Thus it is being used for a job for which it was never intended." (p.63) We note that this misuse applies to assessment of impact to subsistence, as well as to wolves.

- *"If the relation (between pellet counts and HSI) were strong then the HSI model could be relied upon to provide some information about real deer numbers." (p.63, emphasis added.) Instead, Kirchhoff has characterized the correlation as "weak but significant." (Pers. Com. with Edwards, 10/11/04.)*

Person has a similar opinion. (Pers. Com. with Edwards, 10/11/04.) This is also pointed out in the study: "Results from the regression analysis indicate that HSI is significantly correlated with the mean number of pellet groups per plot, but the (r-squared) value is very low, suggesting that HSI is a poor predictor of deer activity (Table A1)." (p.64)

- *Concerning the 100 deer per square-mile multiplier: "This estimate should be considered as a maximum value because pellet-groups represent the cumulative activity of deer over time and density estimates derived from them will likely overestimate the number of deer." (p.66, emphasis added.) We note that the Instructions tab of the 1997 Forest Plan deer model states that ADF&G should be consulted for each project to see if a lower multiplier should be used, but that this was not done.)*

- *"Although our analysis may improve the evaluation of data currently available on deer numbers, it underscores the enormous uncertainty surrounding deer populations and any predictions for the future." (p.67)*

The Person & Kirchhoff presentation of the Person and Bowyer study, then, did not endorse the deer model – it has not been validated, has undergone limited review, is being used for purposes for which it was not intended, and its HSI data has a weak correlation to habitat use.

10. ***FS Assertion****: In reference to the Person & Kirchhoff presentation – "This is where ADF&G suggested that the Forest Service should use 100 deer per square mile in its NEPA effects analyses instead of the 125 deer per square mile multiplier currently used."*

The FS Error*: The Forest Service's assertion overlooks both the statement in the Person and Bowyer study that the 100 multiplier "should be considered a maximum," and the instruction contained under the Instructions tab of the 1997 Forest Plan deer model. ADF&G should be consulted on project-level applications of the model, to determine what multiplier should be used.*

11. ***FS Assertion****: "Given that the deer model is used to evaluate relative differences between alternatives and not provide absolute numbers, in my opinion, use of the deer model is reasonable. The deer model is the best available means of estimating the effects of project alternatives on deer populations."*

The FS Error*: The FEIS uses the model for other purposes besides evaluating the relative differences between the action alternatives. 1) It applies the carrying capacity multiplier to predict the number of deer per square mile in an attempt to estimate impact on wolves. 2) It does the same thing in an attempt to estimate impact on subsistence deer hunting. 3) It estimates impact on deer relative to the current situation, which is a fundamentally different analysis than the comparisons among action alternatives.*

All of this, however, overlooks the fact that the model used is based on a dataset – Volume Strata – that has no correlation to habitat quality. Therefore the results of the model, and the analysis based upon the model, are worthless.

For the above reasons, we believe the Forest Service's defense of the 1997 deer model and its application at the project level is without merit.

Response 5.22 See Response to Comment 5.13 and 5.14.

Comment 5.23 *Note that the above rebuttal to the Forest Service's defense of its model touches on only some of the points we have raised concerning the deer model (and the various issues it affects) in these comments. A significant difference between our arguments here and those in the Threemile appeal is that these comments rely in part on a later discovery that instructions for applying the deer model have not been followed.*

Response 5.23 See Response to Comment 5.13 and 5.14.

Comment 5.24 ***The DEIS Errs (Besides in Modeling) With Wrong Use of Forest Classification Data.***

Apart from the inappropriate use of Volume Strata data in the deer model, we note frequent references to such data throughout the wildlife sections of the DEIS and the projects' Wildlife Report. These references are also wholly inappropriate. They include references to the Volume Strata classifications of High, Medium and Low volume forest, to the amount of deer winter range (derived from those classifications), to deer densities, and include other references that are not always apparent on their face.

Volume Strata data has no place in analysis of the existing wildlife environment or of impacts on wildlife because it has been proven to have no correlation to habitat characteristics. Totally new analyses need to be made for the Tuxekan project, with an eye toward what kind of forest-characteristics data is being relied upon and assuring that the data used is the kind (TimTyp Volume Class) that correlates to habitat characteristics. Then the Wildlife Report, Biological Assessment & Evaluation, and relevant sections of the DEIS need to be rewritten from scratch in light of the new analyses.

On page 3-118, the Tuxekan DEIS has a section titled "Volume Classification." It observes that "(t)he volume class system was found to be inaccurate in its ability to estimate net timber volumes. Volume classes were replaced with volume strata for the classification of forest stands during the revision of the Forest Plan in 1997." While this statement is true on its face concerning inventorying the timber resource as a commodity, the statement falsely portrays the applicability or non-applicability of each of the two forest classification "systems" (datasets) for evaluating habitat quality and impacts to habitat.

The Forest Service, at its own peril and the peril of its Tongass timber program, abandons the use of Volume Class data and relies on Volume Strata data for wildlife analysis on the Tuxekan project and other projects.

Response 5.24 Volume class information has been provided in the *FEIS, Chapter 3: Issue 3 – Wildlife, Biodiversity*, pp. 3-79 to 3-99; *Wildlife: Sensitive Species Assessments, Queen Charlotte Goshawk*, pp. 3-164 to 3-169; *MIS Accounts, Sitka Black-tailed Deer*, pp. 3-171 to 3-177, *American Marten*, pp. 3-177 to 3-183, *Hairy Woodpecker*, pp. 3-188 & 3-189, *Red-breasted Sapsucker*, pp 3-189 & 3-190;

See Response to Comment 5.13, and 5.14.

Comment 5.25

The issue of appropriate uses of the TimTyp (Volume Class) and Volume Strata datasets has been addressed in two Forest Service documents from 2002. An August 6, 2002 memo from Forest Supervisor Puchlerz to the Forest's staff officers and District Rangers "direct(s)" (p.1) that: "

> *A discussion of volume class 6 and 7 being the current best available portrayal of coarse canopy stands will be included in the Wildlife section. A table that displays volume class by alternatives will be included in the Silviculture section and referred to in the wildlife section. In addition, the amount of volume class 6 and 7 should be displayed as part of the small OGR discussion." (p.3)*

While the Tuxekan DEIS has applied this directive in letter, it has not done so in spirit or with professionalism and as a consequence the DEIS fails utterly to analyze wildlife and wildlife-related (e.g. subsistence) issues with the accuracy, fullness and fairness required by NEPA. We believe this demonstrates an absence of professionalism at the most basic level. We find on page 3-131 of the DEIS a rote statement lifted almost directly from Forest Supervisor's directive, along with the table whose inclusion he directed. The DEIS says, though, that this information "is being provided only at the request of several reviewers of previous NEPA documents." As was done on page 3-118, TimTyp Volume Class data is dismissed as irrelevant and implicitly as not worthy of further analysis. Only mentioning the relationship between this data and forest structure does not provide the "discussion" that the Forest Supervisor demanded. Further, we contend it is obvious that the meaning of "discussion," as he used the word, should be interpreted in the fullest sense of the intent and spirit of NEPA. Analysis of the current environment and the effects of the alternatives on wildlife, subsistence and biodiversity should have been infused with considerations of Volume Classes 6 and 7. And conversely, for reasons explained elsewhere in these comments, discussions of Volume Strata data should have been entirely absent from discussions of wildlife, subsistence and biodiversity. Volume Strata represents net board feet per acre, which is irrelevant to wildlife-related considerations. Do not misunderstand TimTyp Volume Classes – the DEIS has assumed that they represent net board feet per acre, but even though these classes were originally intended to do that, it was determined by court action and later by Caouette et al. (2000) that they in fact they do not. The TimTyp Volume Classes do, however, give a good representation of forest habitat structure, as Caouette et al. (2000) has also shown.

Another Forest Service document published about six weeks after Puchlerz' August 2002 directive memo clarifies that memo. This is a paper by Forest Service Region-10's Bill Wilson, "Forest Management Volume Classification – Volume Class and Volume Strata," September 27, 2002. Its concluding paragraph is:

> *"While the TIMTYP Volume Class cannot be used as the basis for net timber volume estimates when implementing the Forest Plan Revision, there is no reason not to use it for other stand characteristics.* ***For wildlife habitat or visuals, where crown closure is much more relevant than net volume per acre, Volume Class will provide a better estimate of existing conditions than Volume Strata****. For this reason, it is recommended that both the Volume Class and Volume Strata be displayed in timber sale environmental analysis.*

These are both readily available in the Tongass geographic information system (GIS).” (p.3, emphasis added.)

This paper makes clear that the Tuxekan DEIS has not used the “better” kind of data available for analyzing wildlife habitat and the project’s effects on it. It is important, however, that Wilson’s conclusions not be applied blindly in project analysis and NEPA documents. Each kind of data should be applied only to its appropriate use. While Wilson said that environmental analysis should include both kinds of data, it is clear, once one understands the nature of the two kinds of data, that Volume Strata data should be used only in analyses where inventory of the timber commodity is of interest. Conversely, it is clear that TimTyp Volume Class data should be used only in analyses where habitat structure of the forest is of interest.

Wilson’s above paragraph is also explicit that Volume Class does not represent net volume per acre which makes apparent that the contrary statement on page 3-118 of the DEIS is in error.

Response 5.25 See Response 5.24

Comment 5.26 ***Impacts to subsistence***

We are very concerned about the impacts of this project on the ten rural communities that rely on Tuxekan Island’s wildlife for subsistence. Our concerns are high because of the severe fragmentation and loss of habitat caused by past logging and road construction, which has removed much of the best deer winter habitat that once existed on the island. Much of the best remaining deer habitat (the lowelevation old growth forest) is targeted by the action alternatives, and significant impacts to deer and deer hunters are likely.

During the Tongass Land Management Planning process (resulting in the 1997 Forest Plan) the severity of past logging on the loss of deer habitat on Tuxekan Island did not go unnoticed. The Forest Plan noted an expected habitat capability loss of 54 percent on the Island a far greater loss than that expected across the Tongass. In fact, Tuxekan had the second greatest expected loss of habitat capability on the entire Tongass. Because of the past harvest on the island, the low number of deer recorded on the island in recent years and a decline in subsistence harvest, additional logging and road construction will only exacerbate these problems. We have little doubt that a significant restriction on subsistence use of deer is probable, if not assured, should this project move forward. Yet, the DEIS states that such a restriction is merely “possible” (DEIS 2-71). We therefore believe the Forest service must follow the requirements of section 810 of ANILCA

Response 5.26 Impacts to wildlife habitat and subsistence uses are addressed under Issue 3 in Chapter 3 of this document.

A deer population at carrying capacity should be able to support a hunter harvest (demand) of about ten percent of the winter habitat capability to be sustainable and provide a reasonably high level of hunter success. Hunter success can be expected to decline in areas where demand is greater than ten percent of winter habitat capability.

The Forest Plan FEIS (Appendix H-81) predicted that by 2005 total hunter demand in WAA 1531 would be approximately 40 animals. An examination of deer harvest data collected by the ADF&G from 1996 through 2003 confirms this projection. Estimated harvests from WAA 1531 have ranged from 0 to 39 animals

annually, with an average of 16 per year, which falls well within forest plan projections.

Under the action alternatives, estimated existing and projected habitat capability is sufficient to meet current demand. The Forest Plan FEIS (page H-81) projected that rural hunter demand would be 66 animals annually by 2095. Total hunter demand was projected to be 72 animals. While these projections fall within 10 percent of the total winter habitat capability, they exceed 10 percent of habitat capability after adjustment for predation under the action alternatives. The cumulative effects of past timber harvesting and future timber harvest, including the proposed project, and the potential to experience a deep snow winter may represent a significant possibility of a significant restriction of subsistence use.

Determinations required under ANILCA are described in FEIS, Chapter 3, Issue 3. Public subsistence hearings were held. One hearing was be held on August 22 in Naukati, Alaska, at the new Naukati School and no members of the public attended. The other hearing was held on August 23 in Craig, Alaska, at the Craig City Hall with no members of the public in attendance.

Comment 5.27

The Tuxekan project poses risks to marten viability.
Marten are well documented as preferring old growth forests below 1,500 feet in elevation. The quality and quantity of such habitat is the limiting factor for winter survival for the marten. Because much of the Tuxekan Project area has already been heavily logged and roaded, and because marten are easily trapped and over-harvested, we are particularly concerned about impacts of this project on marten. Density of roads affects the quality of habitat for marten, and increases their vulnerability to over harvest. A habitat capability model used to evaluate marten habitat on the Tongass National Forest predicts declines in marten densities at road densities as low as 0.2 miles per square mile, and population declines of 90 percent where road densities approach 0.6 miles per square mile (Suring 1993). All alternatives for the Tuxekan Timber Sale far exceed this 0.2-mile threshold.

The post-harvest road densities under the preferred alternative will exceed those recommended for marten. Rather than redesigning the plan to satisfy the needs of marten, the DEIS rationalizes that the road density is not a problem because the roads are not connected to any communities, and therefore the marten will not be impacted. This reasoning is absurd. Nowhere in the Forest Plan does it provide for an exception to the requirement to meet marten standards and guidelines because the roads are not connected to any communities. There is no evidence that additional roads in the area will not increase hunter access and therefore directly impact marten. Given that this is a high-risk area for marten, the lack of analysis presented in the DEIS on this issue is inexcusable.

Response 5.27

See Response to Comment 4.76.

Comment 5.28 *Further, the DEIS provides no information regarding the population of marten in the Tuxekan Sale area and no surveys for marten have been completed. It seems rather bold to make the finding that this sale will not impact marten when the USFS is obviously working in an information vacuum. The focus of logging in higher value forests and the construction of a new road network in the Tuxekan Project Area will plainly have a significant impact on marten populations to claim otherwise is clearly absurd. Furthermore, asserting that no marten will be impacted by the project begs the question since the USFS and ADF&G have no idea what the current population is. It is impossible to determine Increased mortality poses a risk to a population when the population is unknown.*

Response 5.28 See the *FEIS Chapter 3, Wildlife, Management Indicator Species (MIS), MIS Accounts, American Marten*, pp. 3-177 to 3-183, for effects on marten. This analysis includes a discussion on populations, loss of habitat, and the potential for increased vulnerability to trapping.

Comment 5.29 *Because the Tuxekan project is within a high-risk biogeographic province, Forest Plan requires specific standards and guidelines for management of marten habitat. The DEIS states the applicable standards and guidelines, but does nothing to assure the public that they can and will be met. One such requirement is that the GIS volume strata and stand structure that is used to identify high value marten habitat be updated. It is unclear whether the structural requirements that will be employed in units containing high value marten habitat have been calculated based on the entire unit or only on the high value habitat portion of that unit. Please provide the public with the necessary information to address this issue. We are concerned that the silvicultural method described for the preferred alternative fails to meet the requirements of Forest Plan for marten. There must be substantially more disclosure and analysis in the EIS concerning both direct and cumulative impacts to marten. Because of marten sensitivity, any logging that may occur in high value marten habitat should be single-tree selection only.*

Response 5.29 The silvicultural prescriptions described in the FEIS are applied to the whole unit, not only the portions of the units that are high-value habitat. All alternative incorporate a combination of STS and CCR units. Alternative 4, which was designed to emphasize wildlife habitat and old growth connectivity, emphasized the use of the STS prescription.

See the FEIS, Chapter 3, pp 3-177 through 3-183 for effects on marten. This analysis includes loss of habitat, and the potential for increased vulnerability to trapping.

Comment 5.30 *Lastly, the DEIS erroneously relies on the Forest Plan to protect marten viability, while seven years after Plan's adoption it is clear that several of its assumptions concerning marten are, variously, either unsupported or just plain wrong. Please address this new information in any further analysis of this project.*

Response 5.30 See Response to Comment 4.76.

Comment 5.31 ***The Tuxekan Timber project does not protect marbled murrelet nests***

The Forest Plan requires a 600-foot circular buffer of undisturbed forest surrounding marbled murrelet nests. Because the Forest Plan provides specific direction to protect such buffers, it is implicit that to do so one must first survey for nests. Without conducting an thorough on-site survey, it is impossible to locate nests, and thereby achieve Forest Plan's intent of protecting murrelet habitat. Murrelets have been documented in the project area and one nest was found there previously, but this project has made no attempt at locating murrelet nests. We request specific inventories be conducted to locate marbled murrelet nests in the project area.

Response 5.31 Effects on marbled murrelets are disclosed in the *FEIS Chapter 3, Wildlife, Species Accounts, Marbled Murrelet*, pp. 3-195 to 3-196. Murrelet nests are very difficult to find, and are not required. The only known nest location is located in an OGR and would be protected under all alternatives.

Comment 5.32 ***The Tuxekan project violates the requirement of Forest Plan that wolf habitat and dens be protected***

We are extremely concerned about impacts from logging and road construction on the Alexander Archipelago wolf. The health of wolf populations is closely linked with old-growth forests. In a study of the Alexander Archipelago wolf on Prince of Wales Island, all documented wolf dens found were in old-growth forests. Core-use areas of wolves studied on the island occurred in the least densely roaded portion of their home range. Mortality due to hunting and trapping (due to increased access) was higher in areas with higher road densities (Person 1996). As the amount of road access increases, it is more likely that human caused wolf mortality (from both legal and illegal hunting) will become more difficult to manage. Limiting new road construction is the most obvious choice. The interagency wolf conservation strategy developed in conjunction with the 1997 Forest Plan recommends a reserve system of 50,000 acres be present for every 192,000 acres of landscape where the wolf occurs. Please provide the public with the information necessary to show this requirement has been met for wolves in the Tuxekan area.

Response 5.32 See Response to Comment 4.82.

Comment 5.33 *Forest Plan also requires a 1200' forested buffer around wolf dens. The DEIS indicates that no wolf surveys have been completed for the Tuxekan Project, although other wildlife surveys show evidence of wolves using the project area. (For example, goshawk surveys performed in VCU 5570 note wolf scat at stations 7, 12, 14, 19, 30, 32, and 38.) It is implicit in the requirement of Forest Plan to protect wolf dens, and in order to do so the dens must first be located. We request surveys be done to identify wolf dens with the Project Area, and if none are located there to find out where the pack known to use Tuxekan Island has its den. We also request that the carrying capacity analysis be redone to consider the effects of management activities on all land ownerships including state and private lands in the area. It does not appear from the DEIS that this was taken into consideration.*

Response 5.33 See the FEIS, Chapter 3 pp. 3-183 through 3-187 for information on wolf use on the Island. There is no known denning on the island. The Staney Pack only uses Tuxekan Island for several weeks at a time.

Comment 5.34 ***The Tuxekan Timber project fails to protect Endemic Mammals***

The Tongass is home to 54 species of mammals including 24 species or subspecies that are endemic to the stretch of the North Pacific coast encompassing southeast Alaska (MacDonald and Cook 1996).

Twelve other taxa in southeast Alaska have ranges that extend only to coastal British Columbia (Nagorsen DW 1990). Approximately 80-90% of all worldwide vertebrate extinction is believed to have occurred on islands. Endemic species of the Tongass often have small populations and are special risk as a result of human-caused disturbance. Peer Review 1996).

The DEIS does a miserable job at discussing endemic mammals in the area. No project level surveys were done for this project, in clear violation of the Forest Plan standards and guidelines for small endemic mammals. The only species mentioned in the document is the Prince of Wales Flying squirrel.

Before the DEIS can make the bold statement that small endemic mammals will be protected, surveys for such mammals must be conducted as required by Forest Plan. Second, a comprehensive habitat association studies, particularly in pre- and post-logging areas, should be done to determine existing or potential threats from logging activities on the island.

Response 5.34 The discussion and analysis for endemic mammals has been revised for the FEIS, with most of the supporting information found in the wildlife report in the project record. Conclusions can be found in the FEIS, Chapter 3, pp 3-192

Comment 5.35 *Further, the Forest Plan requires surveys for raptor nesting habitat. We are glad to see some surveys were conducted for owls on Tuxekan Island in 2000. During 27 stops, 15 northern pygmy owls, four great horned owls and five northern saw-whet owls were detected (DEIS 3-145). Despite the established existence of such owls, no effort appears to have been made to locate their nests and protect them as required by law. Further, no surveys appear to have been done for other raptors, except the Queen Charlotte goshawk. Even so, a sharp-shinned hawk and a possible red-tailed hawk were spotted in the Project area. The DEIS claims, "specific raptor nest surveys were not required." (DEIS 3-145) This is incorrect, as Forest Plan clearly states that such surveys are indeed required. Please complete the required surveys for herons and raptors required by the Forest Plan and make the information available to the public before proceeding with this project.*

Response 5.35 The TPIT paper clarifies that the intention of these standards and guidelines was to protect rookeries or nests of other raptors if they were found during project planning. It does not require that surveys be done.

Comment 5.36 ***The DEIS fails to adequately access impacts to the Queen Charlotte goshawk***
The Wildlife Report for the Tuxekan Timber Sale states that surveys for goshawks were conducted April 4-7, 2000. We are unclear why surveys were done during this time of year, since it is well documented for the Tongass that if surveys are performed only once a year, they should be done when nestlings or recent fledglings are most likely to be present mid-June until mid-July (Crocker-Bedford 1999). Because of the too early surveying period, no broadcast surveys were done. Please conduct new surveys at the appropriate time of the year, using the appropriate survey methods as required by law.

Response 5.36 TPIT Clarification Papers for goshawk surveys says, "Survey a sample of the potential nesting habitat when there is no reported evidence of goshawk nesting activity. Conduct valley watches to survey potential goshawk nesting habitat." Valley watch surveys were done in April and fall within the courtship period (March-April). After sightings were reported in April 2005, additional surveys were completed. See the goshawk analysis in the FEIS, Chapter 3 pp. 3-164 through 3-169 for more information.

Comment 5.37 ***The DEIS fails to adequately assess impacts to black bears***

Black bears are found on Tuxekan Island, however no studies have been done in the project area to map out bear distribution or estimate population numbers (DEIS 3-136). Given that the FS has little or no information regarding black bears, we believe the DEIS was wrong in concluding that no significant impacts on the species are anticipated (DEIS 3-137). Further, the FS appears to be depending on results from a study done at Luck Lake as being applicable to the situation on Tuxekan. Without having the study explained in detail or available in the appendix, it is impossible to tell if the Luck Lake study is appropriate to apply in this case.

Response 5.37 The effects on black bears and habitat were analyzed and are found in the project record. The Luck Lake study was done on adjacent POW Island and had been incorporated into the FEIS to provide some basis for analysis of effects (second growth and roads).

Comment 5.38 ***The Tuxekan Project puts unique and highly vulnerable karst resources at risk.***

We are highly concerned about the resource damage that the Tuxekan Timber Sale poses to unique karst resources in the area. While it appears that some attempt has been made to map the karst in the area, we believe that much of the carbonate rock fails to appear on the area's geological maps and therefore many pockets of karst remain unidentified. The unit cards are no guarantee to the public that these unique resources will be protected, and reliance on the unit cards to protect karst is based on an indefensible assumption that field crews will be able to identify and protect appropriate windfirm buffers around karst areas.

While the Forest Plan karst standards and guidelines attempt some level of protection for the unique karst of the Tongass, they fall far short of doing so. Furthermore, the Standards and guidelines fail to adequately compensate for past poor logging practices. Tuxekan Island areas classified as Moderate Vulnerability karst, which might otherwise be logged without serious damage under current practices, actually have a heightened vulnerability to damage because of impacts to their systems from prior logging. This seems especially likely for areas of high sink and grike density that are not deep enough to be classified High Vulnerability under current S&G's. Because of the past damages to karst on the Tongass, and because these areas are invaluable global treasure, we request further in-depth analysis be done on the impacts to karst in these areas. We also ask that the Tongass Cave Project specifically be asked to review the sale and visit the project area.

Response 5.38 Unit cards are the primary method by which information necessary to successfully and properly implement a project is transferred from the planning phase of a project to the implementation (field) crews. Field crews are trained in the application of all elements required of them including the design and layout of windfirm buffers. The training and oversight provided assures that crews are capable of accomplishing the tasks. This is not an assumption, but a routine procedure.

The extent of carbonate geology on Tuxekan Island is displayed in Figure 1, Karst Resources, and Affected Environment. This map uses an updated geology GIS layer that clearly shows that 75% of the Island is carbonate. Extensive field work was conducted by URS (2001) and in 2005 by the Forest Service to ensure that karst resource concerns were clearly identified and documented (Baichtal 2005a-c; Fryxell, 2005 and b; North 2005a-g). Resource evaluation was conducted by field personnel trained in the recognition of karst features and the mitigations required to protect them, including windfirm buffers (URS, 2001, Baichtal 2005a-d, USDA).

These resource concerns then formed the foundation of the BMPs applied to each unit on site specific basis, depending on the resource concerns identified for each unit. BMP implementation is required by federal and state law as well as the Forest Service (See Mitigation Measures, FEIS). Applied BMPs may be found in Appendix D of the FEIS and are listed by unit. Many of these mitigations are then applied to each unit during layout, which acts as a "final check or review" for resource concerns prior to harvest.

Under the FEIS section "Known Karst Resources within the Project Area" the effects of past logging have been summarized. We agree that past harvesting practices did not adequately account for karst resource management. However, the Forest is required to operate under existing Forest Plan Standards and Guidelines (USDA, 1997c) which define the sideboards under which harvesting can occur for both moderate, and high vulnerability, karst. In addition, the Forest is required by federal, state, and the Forest Plan to implement BMPs as a means of preventing or mitigating the effects of nonpoint source pollution (Mitigation Measures, FEIS). These BMPs do account for the effects of past harvesting in that a cumulative effects analysis is required and the consequences of past activities must be considered (FSH 2509.25, BMP 12.1). The effectiveness of BMPs in controlling nonpoint source pollution is discussed under Project Mitigations in the FEIS.

Please refer to the Karst Direct/Indirect and Cumulative Effects sections for an in-depth analysis of potential effects to the karst resource, located in the *FEIS, Chapter 3, Karst* pp. 3-61 to 3-65.

Comment 5.39 ***Conclusion***
As detailed above, the DEIS for the Tuxekan Project fails to fulfill the NEPA requirement to conduct a "hard-look" analysis of the project's potential impacts. In addition, the stated purpose and need to move forward with this sale has not been justified.

For these reasons we ask that the No-Action alternative be selected. Should the Forest Service decide to move forward with the project, we expect the legal obligations outlined above to be met and that a Supplemental EIS will be done to address the concerns we have raised. Please keep us updated on this project.

Response 5.39 Comment Noted

Owen J. Graham

Comment 6.1	*Comments on Tuxekan Isle DEIS Unit Cards*
Response 6.1	Comment Noted
Comment 6.2	*A type map of the area around each unit would make it easier to make useful comments. The following comments are made without an opportunity for field review or review of type maps:*
Response 6.2	See ROD Appendix 3 - ROD Access Management Plan Map, which displays volume strata.
Comment 6.3	*Unit 556-409. The areas reserved from harvest are much too large. This will harm the economics of the timber sale and increase the overall amount of road construction necessary by forcing us to access additional areas to pick up the volume "reserved".*
Response 6.3	The current unit configuration maximizes the amount of acreage that can be removed and still meet goshawk and marten standards and guidelines. Some of the areas reserved are identified as high vulnerability karst and would not be available for future harvest.
Comment 6.4	*Unit 556-410. It seems wrong to require helicopter logging on Tuxekan Island. This is one of the least costly road construction areas on the Tongass and this unit is close to existing roads. Further, there is likely a lot more timber that can be accessed in the area. The unit should be accessed with a temporary road and enlarged.*
Response 6.4	The planned unit is surrounded by second growth timber that is not of commercial size, so the planned unit can not be significantly enlarged. The cost of building a temporary road exceeds the cost of helicopter logging.
Comment 6.5	*Unit 556-412. This unit looks like it may have a lot of rotten blowdown and many cable logging difficulties. Are you sure it is worth logging? Perhaps more standing timber should be added to compensate for the blowdown and added cable logging cost?*
Response 6.5	Under Alternative 5 a portion of unit 556-412 has been changed to helicopter yarding with a prescription of clearcut with reserves. This would eliminate "cable logging difficulties" and maximize volume removal. See Appendix B, Unit card for 556-412.
Comment 6.6	*Unit 556-452. This appears to be too little timber to justify the road construction. Recommend you drop or enlarge the unit.*
Response 6.6	This unit has been dropped from Alternative 5.
Comment 6.7	*Unit 557-402. This looks like way too much road for the small amount of timber selected. Suggest you enlarge the unit a lot or drop it.* *Unit 557-404. Again, too much road for a tiny selection of timber harvest.* *Unit 557-405. Same as unit 404.*

Response 6.7 Unit 557-402 is located on proposed road 1470000, which also accesses units 557-403 and 556-409. Units 557-404 and 557-405 are both accessed by temporary roads that would improve economics. These units cannot be enlarged due to being bordered by beach fringe buffer, previously managed stands, and goshawk and marten deferral areas. Economic analysis performed for the sale as a whole shows the current unit configurations to be economically viable. See Social and Economics section in *FEIS, Chapter 3: Issue 2: Timber Sale and Local Economics*, pp. 3-65 to 3-76; *Socioeconomics*, pp. 3-252 to 3-263.

Comment 6.8 *Unit 560-401. Recommend enlarge the unit by dropping all or most of the reserves.*

Response 6.8 Reserve areas are required in order to meet goshawk and marten standards and guidelines.

Comment 6.9 *Unit 560-402. Recommend enlarge the unit toward the SW to compensate for the volume reserved for karst.*

Response 6.9 This unit cannot be enlarged to the southwest due to beach fringe buffer and previous harvest.

Comment 6.10 *Unit 560-403. The karst reserve is so large it ruins the economics of the remaining unit. Recommend trying to reduce the size of the karst reserve or shorten the road by extending the road from the end of the 1450300 system to log the northern half and simply helicopter what is economically feasible from the rest of the unit.*

Response 6.10 Economic analysis performed for the sale as a whole shows the current unit configurations to be economically viable. See Social and Economics section in FEIS, Chapter 3, pp. 3-257 through 3-263.

Comment 6.11 *Unit 560-404. I doubt that four acres of timber is worth reconstructing a significant road system.*

Response 6.11 This section of road has received maintenance work between the DEIS and the FEIS so no additional work is required.

Comment 6.12 *Unit 560-405. Don't create a blind lead in the Southeast corner of this unit, and make sure there is adequate deflection and tail holds for cable logging.*

Response 6.12 Profile analysis would be performed during layout to ensure that adequate deflection and tail holds are present. Due to the location high vulnerability karst and the associated buffers, some blind leads would be created.

Comment 6.13 *Unit 560-407, 408, 411, 416, 417, 428 & 587-412. There is inadequate volume for the proposed road. Recommend you add some volume accessible to the planned road system.*

Response 6.13 Economic analysis performed for the sale as a whole shows the current unit configurations to be economically viable. See Social and Economics section in *FEIS, Chapter 3: Issue 2: Timber Sale and Local Economics*, pp. 3-65 to 3-76; *Socioeconomics*, pp. 3-252 to 3-263.

Comment 6.14 *Unit 587.2-413. It is not a good idea to log up over a cliff. Recommend you drop the small reserve and build a short spur into the southern end of the unit.*

Response 6.14 The small reserve is required in order to protect a high vulnerability karst feature, this makes a spur in the southern end of the unit not feasible. Profile analysis would be performed during layout to ensure that suspension requirements over the cliff area can be achieved.

Comment 6.15 *If the topog. map is correct, the layout requires side-hill yarding, thence suspension over a stream and thence over a cliff. This will be TOUGH!. This unit may need a complete redesign. I see a couple of options. If you are interested, give me a call.*

Response 6.15 Profile analysis would be performed during layout to ensure that the proposed unit is feasible to yard.

Comment 6.16 *Unit 587.2-417. I recommend adding some volume to this very, tiny (2 acre) unit to make it worthwhile.*

Response 6.16 This unit cannot be expanded because is surrounded by beach fringe buffer and previously harvested stands. The timber to the north of the unit is located in a small OGR under Alternatives 4 and 5.

Joanne Daunt

Comment 7.1 *Overall, the Tuxekan Island Timber Sale EIS did not present a comprehensive analysis of the impacts of the project on soil resources. The section included little detail and forwent analysis of concepts central to soil health such as nutrient loss, compaction and soil biota. While the study provided the most information about erosion, the explanation failed to identify specific data such as estimates of the amount of soil loss that would result from harvest. The reader was given limited information on soil characteristics of the project area. Further, a clear relationship between the soil character and the soil's response to activities associated with timber harvest was never established.*

Response 7.1 The revised soils section in the FEIS and revised Soil Resource Report includes more information regarding how the project will meet Regional Soil Quality Standards. The Regional Soil Quality Standards were established in 1992. The specific objectives f the standards are: "Plan and conduct land management activities so reductions in soil productivity potential caused by detrimental compaction, displacement, puddling, alter wetness, and severe burning are minimized. Maintain nutrient capital on all lands at acceptable levels." (FSM 2554). Monitoring of the Regional Soil Quality Standards (discussed in the EIS) has shown that under typical timber harvesting conditions the Regional Standards are met and soil productivity, including nutrient capital will be maintained. These results are further supported by rapid natural regeneration (stocking surveys show all sites are adequately stocked in 5 years) and rapid growth of second-growth stands.

The Regional Soil Quality Standards do not specifically mention soil biota, however the standards are written to maintain the organic matter and physical properties of the soil so that the chemical and physical habitat for soil biota are maintained.

The soil quality standards and the monitoring of them provides a clear relationship between the soil properties and the condition of the soil following timber harvest.

Comment 7.2 *The EIS referenced the Forest Plan goal of ensuring productive forestlands with a variety of age classes indefinitely. In any other agricultural activity, an analysis of soil resources would guide the practice in order to ensure that the new crop has the nutrients and foundation for the desired sustained productivity. The EIS contained no soil nutrient analysis to establish if re-growth is likely to be successful.*

Response 7.2 See response to comment 7.1. A nutrient analysis is not necessary as the nutrient capital is maintained through compliance with the Region 10 Soil Quality Standards. The soils resource report includes more information regarding soil nutrients in project area soils.

Comment 7.3 *The EIS referenced the Forest Plan goal of ensuring productive forestlands with a variety of age classes indefinitely. In any other agricultural activity, an analysis of soil resources would guide the practice in order to ensure that the new crop has the nutrients and foundation for the desired sustained productivity. The EIS contained no soil nutrient analysis to establish if re-growth is likely to be successful.*

Response 7.3 Modeling erosion in southeast Alaska is difficult given the over-riding abundance of groundcover. The variability in precipitation over very short distances also confounds modeling efforts. Groundcover and precipitation are important drivers in soil erosion models, especially with the Universal Soil Loss Equation or Water Erosion Prediction Project model (USDA 2005). Groundcover from slash and vegetation growth that persists despite disturbance from timber harvesting activities usually precludes model estimates that normally would be more robust in drier environments. Added discussion in "Soil erosion direct/indirect effects" more explicitly explains the soil erosion measures used and advantages/disadvantages of soil erosion models considered for analysis. The Soil Resource Report also contains more information regarding the limitations of USLE and WEPP in this environment.

Comment 7.4 *Soil compaction and impacts to soil biota went unmentioned in the EIS. Compaction has the potential to greatly influence the quality of re-growth. A study written by Duke Professor of Soils and Forest Ecology, Daniel Richter (Soil and Water Effects of Modern Forest Harvest Practices in North Carolina), cites a 30% decrease in re-growth height on compacted log landings. The same study examines the important role soil biota play in breaking down organic matter. Organic matter on Tuxekan Island provides protection for the highly-erodable mineral soils, so a discussion of soil biota is relevant.*

Response 7.4 We agree that soil compaction is an important component of soil productivity. A definition of detrimental soil compaction is included in the Region 10 Soil Quality Standards. Due to high amounts of organic matter in the soil detrimental compaction is hard to achieve with logging systems used on the forest. Monitoring of the Soil Quality Standards indicates that detrimental soil compaction is limited to temporary roads (Foss and Landwehr, 2006; Alexander, 2000) which are also detrimental displacements. We do not anticipate detrimental soil compaction from logging systems proposed for this project. Please see the "Soil productivity direct/indirect effects" for this discussion.

Comment 7.5 *I request that the USDA Forest Service provide more information about the topics outlined above in order to more fully understand the impacts on the soil resources of Tuxekan Island.*

Response 7.5 See comments 7.01-7.04.

Joe Donohue

Comment 8.1

The Office of Project Management and Permitting (OPMP) is currently coordinating the State's review of the USDA Forest Service's (USFS) proposed Tuxekan Island timber sales project for comments for NEPA and preliminary comments on consistency with the Alaska Coastal Management Program (ACMP) as described in Sections 204 and 206 of the "Memorandum of Understanding between the State of Alaska and the USDA Forest Service, Alaska Region on Coastal Zone Management Act/Alaska Coastal Management Program Consistency Reviews".

To assist the USFS in their EIS development for the "Tuxekan Island Timber Sale(s)", OPMP has collected the following State preliminary ACMP comments:

Department of Environmental Conservation (ADEC) – On February 11, 2005 OPMP received the following ACMP consistency comments and process recommendations from ADEC:

> *"The Department of Environmental Conservation has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Forest Service's proposed Tuxekan Island Timber Sale. Specifically, this project proposes to harvest between 12.1 and 18.9 MMBF of timber from approximately 381 to 573 acres, and to construct up to 3.6 miles of new permanent road and 5.9 miles of temporary road, and to reconstruct up to 31.3 miles of existing roads, depending on alternative. Most of the timber volume would be transferred directly to barges at the existing permitted log transfer facility at Nichin Cove. Some inwater transfer and rafting may occur during small timber sales to local operators. We offer the following comments pursuant to the Alaska Coastal Management Program (ACMP) and Section 319 of the Clean Water Act."*

Response 8.1

Comment Noted

Comment 8.2

"Based upon the narrative information contained in the DEIS, and the fact that the Forest Plan process group standards and guidelines (RIP2.III.E) will be fully implemented along all Class I, II, and III streams in the project area, we concur with the Forest Service's ACMP consistency determination. Our concurrence applies only to the water quality and fisheries aspects of this sale. "

Response 8.2

Comment Noted

Comment 8.3

"Although we concur with the consistency determination, we do recommend a minor change to the road cards. Specifically, the road cards for all roads to be placed in storage indicate the Alaska Forest Resources and Practices Act (AFRPA) post-sale status as "inactive." However, according to Table 3-33 (page 3-195) and the Maintenance Criteria on the road cards, storage will involve removing all stream crossing structures, installing water bars to control runoff, cleaning ditches, stabilizing cut and fill slopes, and scarifying the road surface to completely eliminate vehicle traffic. This description is consistent with the requirements for closed roads as provided in 11 AAC 95.320 of the Forest Practices Regulations.

Under the Forest Practices Regulations, "inactive" roads require periodic maintenance; specifically, 11 AAC 95.315(c) states "An operator or forest

landowner shall conduct the following maintenance on an inactive road: 1.) as soon as feasible following termination of active use, keep ditches and drainage structures maintained as necessary to assure water flow and fish passage; 2.) keep the road surface crowned, outsloped, water barred, or otherwise left in a condition not conducive to erosion; and 3.) keep ditches and drainage structures clear and in good repair."

Consequently, although this is a relatively minor issue, the AFRPA sections of Table 3-33 and the road cards should be changed from "inactive" to "closed" to better reflect the actual disposition of those roads to be placed in storage following completion of harvest activities."

Response 8.3 We agree. These changes have been made. See Tuxekan Access Management Plan and the unit and road cards.

Comment 8.4 *Department of Natural Resources:Office of Habitat Management and Permitting (OHMP) – On February 16, 2005 OPMP received a message from the Craig OHMP biologist "[that] he concurred with the ADEC comments and did not have anything additional to add at this time."*

Response 8.4 Comment Noted

Comment 8.5 *It is the understanding of the State that following receipt of preliminary ACMP comments, and after a period of consideration of these comments, the USFS will be issuing a "Project Clarification" that will describe any proposed changes to the DEIS Preferred Alternative. Following receipt of the Project Clarification [as per 15 CFR 930.41 (b)], the State will have 60 days to agree or disagree with the USFS' consistency determination. Within this 60-day period, OPMP will submit a consolidated State position in proposed and final consistency letters to the USFS.*

Response 8.5 Comment Noted

Appendix I - Karst Updates

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Unit Number	URS 2001 Karst Evaluation of vulnerability	Karst Rating from GIS Layer	Updates from Forest Service 2005 Field Work and Other Notes	Reference
556-410	moderate	moderate	Moderate vulnerability karst with some deeper features near top of near vertical cliff faces and at south end of unit. Changed to helicopter logging.	Jesenko, 08/10/05 Personal Communication
556-412	moderate and high vulnerability karst	moderate vulnerability adjacent to high vulnerability karst and karst features	Dropped portions of temporary road under Alternative 5, temporary road location changed to reduce cost and eliminate blasting in the area. Change made to road layer.	Emley, 2005
556-451	low	low	Moderate vulnerability karst with some deeper features near top of near vertical cliff faces and at south end of unit.	North, 2005b
557-402	moderate and high vulnerability	low	Low, moderate and high vulnerability on ridge top; Classified road relocation proposed to avoid blasting and 35-40% gradients on moderate vulnerability karst	North, 2005a and b
557-403	moderate and high vulnerability	moderate	moderate vulnerability karst; didn't find URS identified karst features.	North, 2005a
557-404	moderate and high vulnerability	moderate	No additional info from 2005.	no reference
557-405	low and moderate	moderate	No additional info from 2005.	no reference
557-426	moderate vulnerability karst	moderate	moderate vulnerability karst	North, 2005b
557-427	------	------	Unit dropped due to over-steep end (>72%) slopes	Fryxell, 2005a
560-401	moderate	moderate	Moved proposed classified road location 100 ft to the south to avoid closed basin sinkhole on top of ridge; Low and moderate vulnerability except for high vulnerability features; identified additional karst feature. Eliminated SE portion of unit due to karst features	Baichtal, 2005a, Fryxell, 2005a; North , 2005a
560-402	moderate	moderate	Identified additional high vulnerability karst features, rest of unit moderate vulnerability karst; Adjustments made to unit boundary; no road problems, road not changed in layer.	Baichtal, 2005d
560-403	moderate	moderate vulnerability adjacent to high vulnerability karst	combined with 587.2-415; cliffs and windthrow in north west portion has been deleted; leave road as is, MVK and adjacent to HVK	Fryxell, 2005a; North, 2005a

Appendix I – Karst Updates

Unit Number	URS 2001 Karst Evaluation of vulnerability	Karst Rating from GIS Layer	Updates from Forest Service 2005 Field Work and Other Notes	Reference
560-404	moderate and high	Moderate and high vulnerability	No additional info from 2005.	no reference
560-405	moderate and high vulnerability	moderate	moderate vulnerability karst	Fryxell, 2005a; North, 2005a
560-406	moderate and high vulnerability	moderate	moderate vulnerability karst with high vulnerability feature; Road location dropped in Alternative 5	Baichtal, 2005b
560-407	moderate and high vulnerability	moderate adjacent to high vulnerability	bridge will need to be over karst feature on proposed temporary road	North, Pers Comm., 2005
560-408	moderate and high vulnerability	moderate adjacent to high vulnerability	Temporary road relocated to move proposed location off of high vulnerability karst	Baichtal, 2005d
560-409	low	low	moderate	North, 2005g
560-411	low	moderate	road dropped from roads layer; Proposed logging method changed to helicopter.	Baichtal, 2005d
560-412	moderate and high vulnerability	moderate adjacent to high vulnerability	No additional info from 2005.	no reference
560-416	moderate and high vulnerability	moderate	Under Alternative 5 temporary and classified road 1470320 moved to the north to re-locate road off of high vulnerability karst	Baichtal, 2006
560-417	moderate	moderate	Under Alternative 5 temporary and classified road 1470320 moved to the north to re-locate road off of high vulnerability karst	Baichtal, 2006
560-426	moderate	moderate	moderate vulnerability karst, no high vulnerability	Fryxell, 2005a; North, 2005b
560-428	moderate	moderate	moderate vulnerability karst, high vulnerability karst in west	North, 2005a and b
587.2-412	moderate	moderate	Temporary road relocation approved for Alternative 5 to avoid steeper grades and eliminate blasting on moderate vulnerability karst; Change made in roads layer	Baichtal, 2005d
587.2-413	low and moderate	low and moderate	Temporary road relocation approved to avoid steep grades and eliminate extensive blasting.	North, 2005a and b
587.2-414	moderate vulnerability karst	moderate	moderate vulnerability karst	North, 2005a
587.2-417	moderate vulnerability karst	moderate	moderate vulnerability karst for entire unit	North, 2005d

Unit Number	URS 2001 Karst Evaluation of vulnerability	Karst Rating from GIS Layer	Updates from Forest Service 2005 Field Work and Other Notes	Reference
587.2-419	moderate vulnerability karst	moderate vulnerability adjacent to high vulnerability karst	Do not harvest between road and cave, windfirmness issue. Exclude cliff face; Additional karst features identified. Moderate vulnerability karst with high vulnerability features.	Baichtal, 2005c
587.2-424	moderate and high vulnerability	moderate and high vulnerability	No additional info from 2005.	no reference
587.2-425	moderate	moderate	Low and moderately vulnerability karst, with high vulnerability inclusions, Moved specified road location, has 100 ft buffer between cave and road. Additional karst feature identified	Baichtal, 2005c

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